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ORIGINAL COMMUNICATIONS.

CONCERNING OCULAR HEMORRHAGES AND THEIR TREATMENT.[1]

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Evidently a communication of this character in circumstances like these should deal with ocular hemorrhages from a clinical standpoint, and, moreover, from that clinical standpoint which is closely related to the general aspects of the conditions named, and not from a purely ophthalmic or special point of view. I assume also that hemorrhages which depend upon traumatism, or which result from operative work and in association with it, do not find place in this discussion. With this in view ocular hemorrhages may be catalogued:

(1) Epibulbar, usually subconjunctival, hemorrhages; (2) anterior chamber hemorrhages, generally recurring in type; (3) intrauveal tract hemorrhages and their associated vitreous changes; (4) intraocular hemorrhages of retinal origin and position.

1. *Epibulbar, usually subconjunctival, hemorrhages.* (*a*) Of startling appearance but practically always harmless are the extensive subconjunctival hemorrhages which occur during paroxysms of whooping-cough in children. Often bilateral, they may occupy the entire epibulbar surface and even force their way into the lids. The same condition of affairs may arise from any straining effort. Absorption is usually prompt, and visual disturbance in the absence of intraocular changes most unusual, if it ever occurs.

(*b*) Subconjunctival and often recurring hemorrhages or ecchymoses, which occur in elderly persons in association with general vascular disease, appear also in comparatively young persons—that is to say, in persons between forty and fifty years of age, whose blood-pressure is pathological, and who may or may not have an associated nephritis. Sometimes they replace the retinal lesions of chronic nephritis; often they precede them. Usually they occur during sleep, and are more frequent in the left than in the right eye. They may occur at comparatively short intervals; sometimes the periods between the extravasations comprise weeks or months. When they rapidly disappear, if anything, this represents a peculiarity which enhances the significance I venture to give to them. An interesting association is recurring subcutaneous ecchymoses of the lids. Very small bluish or purplish spots, looking like small bruised areas, appear, and like their congeners in the conjunctiva they come and disappear quickly, and they have exactly the same significance. Occasionally subconjunctival hemorrhages and subcutaneous lid ecchymoses alternate.

The practical point, briefly, is that in these circumstances—that is to say, in the presence of any of these hemorrhages—thorough cardiovascular and renal examination is strongly indicated, and will often be rewarded by finding abnormal blood-pressure or renal disease, even in persons who are apparently in perfect health, for we all know that serious renal disorder is sometimes latent, and even in an advanced grade may be compatible with mental and bodily vigor.

[1] Read in the Symposium on Hemorrhage in the County Medical Society, Jan. 28, 1914.

2. *Anterior chamber hemorrhages, generally recurring in type.* To this phenomenon I would briefly call attention only in so far as hyphemia (this being the technical term for hemorrhage into the anterior chamber) may be a symptom of, or at least occur in association with, purpura, certain toxemias, and diabetes. In the last-named instance not infrequently an iritis complicates the state of affairs. Like the subconjunctival hemorrhages, these rarer manifestations in the anterior chamber are recurring, coming and disappearing quickly. A patient with iritis which is associated with recurrent hemorrhage into the anterior chamber should be carefully examined for the presence of sugar in the urine. Less frequently hyphemia is a symptom of general arteriosclerosis.

3. *Intrauveal tract hemorrhages and their associated vitreous changes.* That hemorrhage in the vitreous chamber may occur in anemia, nephritis and diabetes, arteriosclerosis, and as the result of the absorption of certain toxins, is well known, the source of the blood being either the vessels of the choroid, ciliary body, or retina. If the ciliary body is the source, the hemorrhage bursts through the hyaloid into the vitreous and is there readily detected, either in its fresh state, or at a later period in the form of various types of vitreous opacity.

Now an interesting and important group of cases are those which relate to young persons, generally male adults, who are the subjects of spontaneous hemorrhage into the vitreous, often associated with hemorrhage in the retina. These patients generally are constipated, their circulation is irregular, and they suffer from epistaxis. The gouty diathesis was supposed by Hutchinson to be the cause of this distressing condition of affairs, which sometimes, and, indeed, not infrequently, leads to permanent blindness. Recent investigations, particularly in the Freiberg im Br. clinic, indicate that of importance as an etiological factor in these circumstances is tuberculosis, and that the active agent is a tuberculous toxin. Certain clinical observations of my own in association with Dr. Holloway tend to confirm the accuracy of these observations.

Some of the best therapeutic results have followed the persistent use of tuberculin injections, especially if these are proliferating retinal lesions. It must be remembered also that anomalies in the coagulability of the blood may account for many of these lesions, and in these circumstances the administration of calcium salts is worth a trial, and intravenous injections of human blood serum have been used.

Naturally all of these hemorrhages may be caused by syphilis, and therefore in circumstances like these the patient should be subjected to all modern tests—Wassermann, etc. Even in the absence of syphilis iodides are of service, as also is mercury. So-called autointoxication must be corrected, and diaphoresis is of service.

4. *Intraocular hemorrhages of retinal origin and position.* These constitute an important, indeed, the most important, group of ocular hemorrhages. Their causes, based on the classification of Dimmer, may be catalogued thus:

(*a*) Hemorrhages caused by changes in the composition of the blood and the tissues of the blood-vessel walls; pyemia, septicemia, ulcerative endocarditis; diseases of the liver, spleen, kidney; atheroma of the vessels, and angiosclerosis of the retinal vessels; loss of blood (menorrhagia, hematemesis, especially if there is carcinoma of the stomach, the so-called cachectic hemorrhagic retinitis); anemia (simple and pernicious); hemophilia, purpura, and scurvy; diabetes and gout; tuberculosis; malaria and recurrent fever. Naturally, in certain types of syphilitic disease of the retina hemorrhages are an associated condition, particularly in the so-called syphilitic retinitis with hemorrhage, but hemorrhages in syphilitic retinitis are of comparatively rare occurrence.

(*b*) Hemorrhages caused by disturbances of the circulation; hypertrophy of the heart and stenosis of the valves; thrombosis of the central vein of the retina and embolism of the central artery, suffocation, compression of the carotid; and hemorrhages in the newly-born, a not infrequent complication, and from menstrual disturbances.

(*c*) Hemorrhages caused by sudden

alteration of intraocular tension, for example after iridectomy, which do not come now into discussion. Interesting are those hemorrhages which occur after large cutaneous burns, and those which follow compression of the thorax and of the neck and blows upon the head.

(*d*) Hemorrhages caused by certain toxic agents—for example, phosphorus, chlorate of potassium, serpent virus, and the reabsorption of toxins from the intestinal tract of bacterial origin.

These hemorrhages may be in any layer of the retina, may remain in their original position, or burst through the limiting membrane and fill the vitreous. By preference they are found along the course of the vessels. The macula is a favorite seat. An unusual type of hemorrhage is the so-called preretinal extravasation, which lies between the internal limiting membrane of the retina and the hyaloid membrane of the vitreous, and which is not a little prone to make its way into the vitreous.

Naturally, in the short time at my disposal this evening I cannot analyze the various diseases named in this classification, but can only point out the necessity of ophthalmoscopic examination under conditions like these, and indicate the various interesting findings which reward such examination.

Of two types of retinal disease I must make more particular mention, as they are of special interest to the general clinician, to wit: the retinal hemorrhages which occur in connection with various types of chronic kidney disease, and the retinal hemorrhages which occur in association with angiosclerosis of the retinal vessels, itself frequently an early and prominent symptom of cerebral angiosclerosis.

We all know that there is an intimate relationship of certain diseases of the kidney to certain lesions in the fundus of the eye, and that these lesions are somewhat loosely grouped under the term "albuminuric retinitis," and that we are wont to speak of a typical albuminuric retinitis, but what must be definitely understood is that lesions in the fundus oculi coincident with various types of renal disease do not manifest themselves only in the form of albuminuric retinitis and its varieties, and especially in the so-called typical varieties; in point of fact, I believe I am correct in saying that the so-called typical albuminuric retinitis is comparatively rare; or, rather, rare in comparison with many minor lesions, often solely composed of hemorrhages and their results, which minor lesions are just as significant of chronic renal disease as when the process is a widespread and more elaborately produced one. To put it in a sentence, then, the so-called typical albuminuric retinitis, with star-shaped figure in the macula, large exudates, and the so-called snow-bank appearance around the disk, is by no means the most frequent manifestation of this condition of affairs. More often, especially in earlier stages, the renal disease is interpreted by a form of congestion around the optic nerve, small scattered hemorrhages, sometimes in the fiber layer and sometimes in deeper layers, dots in the macula, little fluffy exudates in the periphery of the eye-ground, lesions which readily escape examination unless the ophthalmoscopic examination is a searching one.

It is perhaps permissible to deviate strictly from my subject to say this: Inasmuch as chronic interstitial nephritis, the most frequent cause of retinal lesions, is comparatively rare before the twenty-fifth year of life, the retinal lesions—that is, those which I describe—are also rare before that period of life, the percentage rising between the age named and forty, and growing still greater between forty and sixty; but children are not exempt. More men than women are affected, and taking all types of retinal lesions the result of Bright's disease, it is quite safe to say that fully 25 per cent exhibit some form of retinal change, and we may expect retinal changes in chronic interstitial nephritis, in chronic parenchymatous nephritis, and in patients with secondarily contracted kidney, a sequel of large white kidney.

Although retinal lesions and retinal hemorrhages may be coincident with the period of cardiac hypertrophy, this coincidence is not necessary. In general terms, certainly the kidney disease must be pres-

ent some months before the retinal lesions appear, particularly the retinitis, but retinal hemorrhages may often long antedate an active kidney lesion, if also angiosclerosis antedates the activity of the nephritic disease.

One word more, and I leave this digression: Almost every text-book states that the prognosis of various types of retinal disease, associated with nephritis, renders the prognosis *quoad vitam* exceedingly unfavorable, and large statistical tables are available which, in general terms, state that the patients rarely live longer than two years after the development of these retinal lesions. This is not correct. The prognosis is of course unfavorable, but many patients live five, seven, ten, and even a greater number of years after the retinal lesions develop. It must be remembered that ophthalmologists often see the retinal lesions of renal disease late—that is, they probably have existed for some time before their detection—and therefore it is not correct to say that many patients die within two years after the appearance of the retinal changes in Bright's disease, but only that they are apt to die within this period of time after these lesions have been discovered. That the reverse is true, and the ophthalmoscope is the means of detecting Bright's disease long before its clinical manifestations are marked, is well known. I am perfectly sure that a reconsideration of statistics of modern work in the management of Bright's disease, even though there be retinal hemorrhages and other lesions, would show that the prognosis is much more favorable than the ordinary text-book statements would lead us to believe.

Alterations in the caliber and relation of the retinal blood-vessels in association with retinal hemorrhages are important signs, not only of nephritis, but of general arteriosclerosis. In the earlier stages the signs are suggestive only, and include uneven caliber, undue tortuosity of the retinal arteries, with increased distinctness of the central light streak and an unusually light color of the breadth of the artery, the so-called high light. At this stage hemorrhages are not usually present. Later on, and now the signs become pathognomonic, there are changes in the size and breadth of the retinal arteries, of such a character that a beaded appearance is produced, distinct loss of translucency, evident lesions in the arterial walls (perivasculitis), alternate contractions and dilatations of the veins, and the important sign which is known as indentation of the veins by the stiffened artery, exactly as a solid rod would indent a rubber tube lying beneath it. At this stage, in addition to edema of the retina and gray opacity around the disk, hemorrhages, especially along the course of the vessels, are frequent; sometimes round hemorrhages, sometimes drop-like hemorrhages, and not infrequently capillary extravasations on and near the disk are evident.

Now, while such appearances are more frequent in persons who have reached mature years, it must be remembered that very old people frequently have perfectly healthy retinal arteries. In other words, these signs may occur in those who have not done more than reach middle life, and are even seen in juvenile patients, especially when they have nephritis. The significance of these retinal changes pertains especially to arteriosclerosis, and in particular to sclerosis of the carotid system. It is too much to maintain that if we find such retinal vessel changes and retinal hemorrhages, similar lesions are occurring, or are likely to occur, in the finer vessels of the cerebral cortex, just as the cerebral cortex may exhibit greater or less pronounced vascular disease without ophthalmoscopic change, but it is not too much to say that they represent an importance from the diagnostic standpoint quite equal to, if not greater than, that furnished by a study of the pulse, the character of the first sound of the apex, the second sound of the aortic area, the sphygmogram, and the results obtained by the instrumental measurement of arterial tension. They represent phenomena to be studied by the ophthalmoscope in living tissue at a place where what is actually going on in the living blood-vessels can be observed, as it can be observed nowhere else in the human body, or at least not so accurately.

A point I would like to emphasize is that such a condition of affairs, while strongly indicative of high arterial tension and arteriosclerosis, especially of the carotid system, is often deeply significant of a process which may eventuate in a chronic interstitial nephritis which has not produced the ordinary so-called renal retinitis. Certainly no case of cardiovascular disease, or suspected disease of this system, is properly studied without ophthalmoscopic aid.

In regard to the treatment of retinal hemorrhages and the various types of hemorrhagic retinitis, as they are usually called, caused by the various diseases which I have named, there is not much to say because the treatment necessarily consists in largest measure in the management of the general or local disease which has occasioned the retinal lesion. In general terms, the various iodide preparations are usually employed, if not contraindicated by other conditions. In the absence of a specific taint, either iodide of sodium or a good preparation of syrup of hydriodic acid is in my judgment the most satisfactory of these various iodide compounds. Elimination is most important, and hot packs, if the patient is feeble and is best treated in the recumbent posture, or cabinet sweats, are exceedingly useful. I have not myself had much experience in the attempt to dissipate these retinal hemorrhages by means of high-frequency currents and the application of the galvanic current, but some colleagues are impressed with the value of this method of treatment. I am sure that, certainly in Bright's disease, retinitis with hemorrhages is often materially favorably influenced by the administration of large doses of the tincture of chloride of iron, with or without the addition of small doses of bichloride of mercury. Hot packs on the eye are often tried—at least they can do no harm. If the blood-pressure is very high—that is to say, if it is an overplus pressure—naturally the various agencies which are used to reduce it are indicated, but I would like to enter my protest against what all of us must have seen many times, and that is the brutal knocking down of a high blood-pressure simply because the instrument registers a pressure above the accepted physiological limit. As Hobart Hare has aptly put it, there is no more sense in reducing a blood-pressure which represents the patient's pathological norm than there is in reducing a blood-pressure below the physiological limit.

A word in regard to the prognosis of these retinal hemorrhages in association with evidences of angiosclerosis. Always this is very grave, but it is perfectly silly to condemn patients to speedy death because they have a certain amount of angiosclerosis and various hemorrhages in their retinas, thrombotic or otherwise in origin. Under proper management these patients often live for long periods of time, and live useful lives. In fact, I think the life of a good many patients has been prolonged because very early signs of angiosclerosis and small retinal hemorrhages have been discovered, the discovery leading to a modification of their habits of life, which in its turn has eventuated in the prolongation of life to which I have referred. I do not for a moment wish to minimize the serious import of this condition of affairs, but I think it is quite time for clinicians to put upon record how with modern methods these patients are successfully managed and kept in good condition for long periods of time.

When discussing the hemorrhages which occur in the uveal tract, I made reference to the recurring hemorrhagic extravasations in the vitreous, especially of young people, and told you how in all probability many of these cases depended upon a tuberculous toxin, and this is true of a certain number of retinal hemorrhages, especially when in association with them the so-called proliferating retinitis develops, and this etiological factor must never be lost sight of in our investigations of these conditions.

It is probably, and I should say certainly, true that some otherwise unexplained retinal hemorrhages depend upon other bacterial toxins, which arise particularly in the various types of intestinal sepsis, sometimes more or less loosely called autointoxication, and it is not unlikely that here too we deal either with bacterial toxins or with actual

emboli in the retinal capillaries of the bacterial elements themselves.

There is no doubt that in certain disorders of metabolism, or perhaps I should say of nutrition—for example, diabetes—retinal hemorrhages are not uncommon, often associated with other lesions which are more or less diagnostic, and the same to a less extent is true of certain types of chronic gout, although usually the manifestations of this disease, so far as the eyes are concerned, take on other forms.

So much importance has been given in recent years to oral sepsis, infections from the tonsillar pathways, and various types of accessory sinus infection and nasopharyngeal disease in their relation to ocular conditions, that in the presence of otherwise unexplained retinal hemorrhages these areas must not be neglected in examination, and in any event the elimination from them of infected or diseased areas is a perfectly proper treatment, whether they be demonstrated as etiological factors or not.

What I would like, finally, to emphasize is that in a large number of diseases of the body, chiefly those that relate to the cardiovascular system, to the kidneys, and to conditions of increased intracranial tension, as well as certain types of disturbance of metabolism, ophthalmoscopic examination is very important. Naturally it appeals to me, but I maintain for reasons already recited that repeated ophthalmoscopic examinations in the diseases which I have named are just as important as examinations of the blood-pressure, of the urine, and, in general terms, of the cardiovascular system.[1]

UTERINE HEMORRHAGE.*

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In our discussion to-night I take it that the practical and clinical view-point of the general practitioner is the important one.

The *obstetric hemorrhages* are due to abortion, extra-uterine pregnancy, myxomatous degeneration of the chorion, separation of the placenta (prævia and normally situated), rupture of the uterus, atony of the uterus, retained secundines, subinvolution, and inversion of the uterus.

It is unnecessary and there is not time to discuss the etiology and diagnosis of this group of hemorrhages. It seems to me rather more to the point to briefly and rather dogmatically criticize, and from my experience pass judgment upon, the methods of treatment now in vogue.

Abortion.—When the uterus spontaneously starts to bleed early in pregnancy, it usually empties itself. "Threatened abortion," so-called, is really very rare. Rest in bed and opium enough to produce drowsiness will sometimes tide the patient over the crisis, but so rarely does this happen that one begins to doubt the occurrence of "threatened" abortion until at very rare intervals one finds the pregnancy continuing and is forced to believe that a threatened abortion is at least possible.

We cannot yet discard the aseptic tampon in treating inevitable or incomplete abortion, but the time is almost at hand to discard the curette. In all forms of uterine hemorrhage, obstetric or otherwise, that much-overused instrument is finally taking its proper place as a diagnostic, not a therapeutic, measure. In abortion it should rarely be used, and then mainly to explore and empty the uterus. After labor it is practically never used, in pelvic inflammations it is always harmful, and in ectopic pregnancy unrecognized it often will be fatal. One could write an interesting and tragic paper on the "Passing of the Curette in Obstetric Practice." Early spontaneous abortions in private practice are usually complete. In hospital work, with no knowl-

*Part of a Symposium on Hemorrhage read in the Philadelphia County Medical Society, Jan. 28, 1914.

[1] In this paper I have freely quoted from certain writings of my own, viz.: "Intraocular Angiosclerosis and its Diagnostic and Prognostic Significance," International Clinics, Vol. I, seventeenth series: "Concerning the Signs in the Retina of Persistent High Arterial Tension," *Ophthalmic Record*, August, 1906; "The Eye and the Kidney," THERAPEUTIC GAZETTE, Nov. 15, 1907.

edge of prior aseptic management, the curette is still useful in my hands, but only for diagnosis—*i.e.*, to determine and obtain early in the case an empty uterus.

There is but one treatment for extra-uterine pregnancy, and that is immediate abdominal section in a well-equipped hospital after thorough preparation of the patient. The clinical history of rapidly fatal hemorrhage is rare. Hurried, "pen-knife" surgery is never warranted.

Serious hemorrhage from separated placenta, prævia or otherwise, demands prompt emptying of the uterus. The important factor in the treatment is not consideration of the child, but a study of the soft tissues of the birth canal, especially the cervix. How they shall be dealt with depends much upon the environment and the attendant's operative skill. The dilating bag, forceps, version, or Cæsarian section may be indicated. Best send such cases to hospital with the vagina packed to overflowing with a clean tampon. The size and aseptic character of the tampon and its aseptic application are the general practitioner's first step in saving or losing life in these grave hemorrhages. The expert will fall down in his efforts if this preliminary work is not well done.

Rupture of the uterus, complete or incomplete, is best treated by the general practitioner with a firm aseptic tampon from fundus to vulva. Hospital facilities will sometimes make an abdominal section desirable, but not always.

Postpartum hemorrhage is easier prevented than cured. Manage the second and especially the third stages of labor correctly, use pituitrin and ergot intelligently, know how to properly tampon the uterus from fundus and vulva, anteflex the tamponed uterus over the symphysis, and you will have no occasion to try the more dangerous Momburg tubes.

Hemorrhage from the uterus not associated with pregnancy is the more important subject for your discussion to-night. The mucous membrane of the uterus may bleed, just as do other mucous surfaces of the body, from causes independent of the special function of the womb, but in such cases sooner or later local changes are induced, so that broadly speaking there is always a local cause. Constitutional causes of uterine hemorrhage produce either changes in the blood or in the blood-vessels. Changes in the blood such as the hemorrhagic diathesis, purpura, scurvy, malaria, the acute exanthemata, and changes in the blood-vessels, as high venous pressure from mitral disease, local venous stasis from pressure of tumors, the circulatory disturbances due to cirrhosis of kidney or liver, and to alcoholism or syphilis, need only passing mention. They have been recognized for years as contributing causes of uterine bleeding. Physiological chemists have shown us how defects in metabolic processes—notably faulty calcium metabolism—or disturbed relations between the thyroid and ovary, are new problems to offer explanation of the rarer hemorrhages unassociated with demonstrable pelvic lesions. This latter phase of the subject will doubtless in the future have its bearing upon the hemorrhages observed in nervous conditions such as hysteria, neurasthenia, and mental depression. The careful physician will not overlook these general or constitutional causes in studying any case of uterine bleeding, but local causes are so often associated with any of the above, and more often are the only causes, that diagnosis and treatment can never be complete without careful study of the pelvic organs.

In order to practically study local causes of uterine hemorrhage it seems best to group the periods of life in which they find their frequency and importance. These are: (1) the period of reproductive activity; (2) the climacteric; and (3) puberty and the earlier years of menstrual life.

1. *Period of Reproductive Activity.*—Closely following miscarriages or labor, subinvolution, retrodisplacement, endometrial hypertrophy and infection, and a torn and relaxed pelvic floor, with or without too early resumption of sexual life, are frequent causes of excessive bleeding. At a later period, or in sterile wives, neoplasms, inflammatory septic conditions within and without the uterus, fixing it and its adnexa by adhesions, are common causes. Hemor-

rhagic endometritis, decidual or other polyps, tubercular or cancerous ulcerations may be found during this period. In old maids and sterile wives fibroids or polyps with adenomatous uteri are not uncommon. Cancer has been the cause of death once in every fourteen women after thirty-five years of age, and once in every nine after forty-five.

2. *The Climacteric.*—Uterine hemorrhage, pre- and post-climacteric, is the type of hemorrhage assuming the greatest importance in recent years. The educational propaganda, the activity of research, the newspaper dissemination of knowledge, even with its will-o'-the-wisp and rainbow chase of radium and its exploiters—all attest the lay and professional interest in cancer. It is important to study clinically the type of a woman's menopause. The menstrual flow may cease abruptly, it may be gradual, it may be associated with a series of hemorrhages. The flow having ceased and then returning is most significant of a local lesion. Bleeding at this time of life may be due to a polyp, to fungous endometritis, to arteriosclerosis associated with high blood-pressure, to syphilis; but when we remember that one in nine dies of cancer the importance of early exact diagnosis is self-evident. This can only be done early by the microscope, and no matter how great the inconvenience, the curette for the body and an excised portion of the cervix must be forthcoming to the pathologist if the physician does his duty. Delay until diagnostic clinical signs are present is the patient's doom. Radium and surgery thus far acclaim the truth of that statement.

3. *Puberty and the Earlier Years of Menstrual Life.*—Uterine bleeding at this period is more often constitutional in origin and tends to spontaneous cure. At puberty sometimes the ovaries may be functionally mature while the uterine musculature is deficient. Indolence, luxury, too exacting school work, lack of physical exercise, are sometimes the cause. In young women approaching the marrying age, local causes are more common. Mucous polyps, adenomatosis uteri, or bacterial infection may be present.

To epitomize the principles of *treating uterine hemorrhage,* it is necessary to emphasize the fact that diagnosis of the cause is absolutely necessary. The *routine* use of drugs is useless; their *discriminating* use is limited. Ergot, stypticin, and hydrastis are the only drugs I ever use, and they are never employed until the uterus is known to be empty and free from gross lesions of the endometrium. Pituitrin can only be used hypodermically. I have no experience with its gynecological efficiency. Thyroid extract has been efficient in some cases supposed to be due to deranged ovarian function. Calcium chloride in fifteen-grain doses is said to be efficient after testing the coagulability of the blood. Laxatives are always useful. Salines or phenolphthalein are preferable to aloin combinations.

Local Applications.—The copious hot vaginal douche, and ichthyol and glycerin tampons, to reduce congestion, are always useful in non-operative cases, such as subinvolution and chronic pelvic congestion. The same is true of the constant electric current. If too freely used the latter may lead to superinvolution and sterility.

To control temporarily a serious uterine hemorrhage a firm uterine pack wet with iodine or adrenalin I have found useful. Having discovered by vaginal examination a gross pelvic lesion, drug treatment should cease.

If the bleeding is due to the injuries of labor or the results of a miscarriage, an operation is advised. Hypertrophic endometritis is curetted; laceration or hypertrophy of the cervix is repaired or amputated; cystocele and relaxed pelvic floor are repaired by a modified Goffe operation and a modified Emmett operation on the pelvic floor; if the uterus is displaced the round ligaments are shortened either through the inguinal canals or by the Mayo method through an abdominal incision. When the uterine bleeding is due to hopelessly diseased pelvic organs from grave infection a hysterectomy is indicated.

When a myoma is discovered the new treatment with the more powerful *x*-ray than hitherto used, as exploited at present throughout Germany, has begun to find its way in America. These powerful rays, through their influence on the chemistry of the body cell, probably that of the ovary, are said to control hemorrhage and reduce the tumor. The future must decide the real value of this treatment. Thus far the results as I have studied them have not diverted me from surgery for fibroids associated with inflammatory symptoms, large enough to produce pressure symptoms, and bleeding enough to threaten grave anemia.

Cases presenting no gross lesions, but bleeding freely at or shortly after puberty, or causing the pre- and post-climacteric metrorrhagias, not benefited by the curette, are thought to be due to disturbed ovarian function. Attempts to correct this function have been made by *x*-rays, or by using antagonistic glands of internal secretion. Thyroid, ovarian, mammary, adrenalin, and pituitary extracts have all been used in such cases, with results still uncertain. In elderly women these cases have been successfully treated by the application of live steam to the endometrium. For this last class of cases I have, where otherwise it was justified, resorted to hysterectomy.

The dangers of the indiscriminate use of the curette in obstetric practice have been referred to. The same statement is in part true in gynecology, its only therapeutic field being that of degenerative changes in the endometrium, including polyps.

For temporary relief in cancer, the thermocautery followed later with applications of acetone and radium will check hemorrhage and prolong life. Wertheim's operation is indicated, and has justified its use for carcinoma diagnosed early by microscopic study.

THE TREATMENT OF SCIATICA.

BY F. X. DERCUM, M.D.,

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The point of prime importance preliminary to the treatment of sciatica is the diagnosis. This is an absolutely necessary prerequisite. A moment's reflection will convince us that not all patients suffering from pain in the sciatic distribution are cases of sciatica. At the outset the cases separate themselves into two groups: first, those in which the pain is due to neuralgia or neuritis in the sciatic nerve or its branches; and secondly, those in which pain arises in the sciatic distribution as a result of lesions elsewhere—*e.g.*, within the pelvis, in the sacrum or spinal column. In other words, pain in the sciatic distribution may be purely symptomatic, and it is the not infrequent failure to recognize this fact which is so often responsible for cases regarded as intractable and hopeless of cure. The first step therefore in a given case is to eliminate all possible causes of a symptomatic pain and to establish the fact of a true sciatica. This diagnosis rests first upon pain beginning at the sciatic notch, descending in the middle of the posterior aspect of the thigh along the course of the nerve and perhaps involving in varying degrees its branches, the internal and external popliteal and their subdivisions. The pain either occurs in crises or is continuous, in which case it is subject to exacerbations. Secondly the pain is evoked or made worse by pressure, by motion, by constrained position.

It is important to note that the sciatic nerve is not tender or sensitive to pressure over its entire course; at least the latter is decidedly the exception. The most frequent finding consists in a series of discrete points of tenderness. Thus it is very common to find a point of tenderness over the great sciatic foramen, another a little lower down external to the tuberosity of the ischium, another in the midpopliteal space, and others still at various places lower down—for instance, below the head of the

fibula, and within or below the internal malleolus.

Occasionally tenderness over the sacral plexus may be discovered by a rectal or vaginal examination. However, cases in which the tenderness is limited to the plexus and cannot be discovered in the course of the nerve itself should be viewed with suspicion. Pain upon motion is another symptom of value, as is also the peculiar position which the patient adopts; but we must bear in mind that both of these symptoms may be present in some degree when the pain is due to lesions within the pelvis, sacrum, or spinal column. Here the differentiation may be made by careful analysis of the character of the motion necessary to elicit pain, as, for instance, eliciting pain by extension of the lower leg, the thigh being held in a fixed position. Again, while in pain of intrapelvic origin the weight may as in sciatica proper be thrown upon the sound leg, this is the exception, as is also any noticeable degree of spinal curvature. It must be borne in mind, however, that cases are frequently met with in which intrapelvic, sacral, or spinal disease has subsequently been followed by disease of the sciatic nerve itself; though such complicated cases are usually unraveled by the history and by the presence of cognate symptoms.

The term sciatica should obviously be limited to cases of neuralgia or neuritis of the sciatic nerve itself, and it is the treatment of this group of cases to which I will first request attention. The diagnosis of sciatica having been established, it is next of importance to consider the character of the change in the nerve and to determine when possible the cause of this change. Both factors are extremely difficult and frequently impossible of solution. As regards the change in the nerve, the evidence is extremely unsatisfactory. Opportunities for the examination of the nerve microscopically have been very infrequent and the results practially negative, while inspection of the exposed nerve in surgical procedures has only occasionally revealed appearances suggestive of organic change—for example, swelling and possibly thickening of the perineurium. In other words, it is exceedingly probable that, as in nerve pain elsewhere, the change which takes place is not demonstrable. Only exceptionally do the facts justify the diagnosis of a neuritis. The differentiation between a neuralgia and a neuritis of the sciatic is sometimes a matter of difficulty. Suffice it to say, however, that neuritis is the exception, but that when undoubted trophic changes are present, such for instance as wasting of muscles, fibrillary tremor, decided sensory loss, changes in the electrical responses of the muscles, loss of tendo Achillis jerk on the affected side, the diagnosis of a neuritis is justified. It is significant, also, that in a neuritis the tenderness over the nerve trunk is apt to be continuous and not discrete.

The next problem that presents itself is as to the cause of the pain. This necessitates bearing in mind the following possibilities, namely, rheumatism, gout, diabetes, the intoxications, alcohol and lead, various infections, cold, trauma, and finally a depreciated nutrition. The differentiation of these various causes it is not my province to discuss in detail. However, it may suffice to point out that the "rheumatism" which is so often an active cause is of the same nature as that which causes muscular rheumatism whatever the basic pathology of that condition may be; that the latter is infectious is of course extremely probable. It should be added that in sciatica due to rheumatism, so-called, there is not infrequently an associated rheumatism of muscles, as *e.g.* a lumbago. Gout as a cause of diabetes is exceedingly frequent. Sciatica, on the other hand, is now and then also met with in diabetes, and is under such circumstances rather remarkable for the fact that it is bilateral. Alcohol and lead are in the experience of the writer such rare causes of sciatica as to be practically negligible. This is almost equally true of the infections; rarely a sciatic neuritis complicates a sepsis or occurs as a sequel of typhoid fever. Other infections, such as syphilis and tuberculosis, can be dismissed without comment. Cold, such for instance as may result from

sitting upon a wet or cold object, appears to give rise to a condition similar to or identical with that termed rheumatism. In the case of trauma, the fact of injury is embodied in the history.

The problem of treatment resolves itself into, first, the control of the pain, and secondly the introduction of such measures as will bring about cure.

The first indication is met by rest. If the sciatica be severe, the patient has already adopted a plan of relative rest by means of which the weight of the body is mainly borne by the sound leg; at the same time, by assuming a certain degree of spinal curvature, slight flexion and slight abduction of the affected limb, the nerve and adjacent muscular structures are relaxed as much as possible. Rest, however, when applied as a therapeutic measure, should in given cases consist of rest in bed allowing the patient to place the limb spontaneously in such position as he finds most comfortable. In other cases the limb should be fixed in a splint, following the plan originally instituted by Weir Mitchell many years ago. A long external splint, extending from the axilla to below the heel, or an anterior splint may be applied, bearing in mind to very slightly flex the thigh and leg. Instead of a splint, sand-bags may be used. In an ordinary acute case of sciatica merely resting in bed, without mechanical fixation or support, may prove sufficient; indeed, in my own hands this simple expedient has succeeded in the larger number of cases. However, whatever detail be instituted, it must be emphasized that in sciatica rest is the most powerful therapeutic agent at our command, and that, in given instances, the rest of the affected limb should be made as nearly absolute as possible.

As soon as adequate rest has been instituted, we should employ medication. Unless special factors present themselves it is my plan to make use of the salicylates. The method of their employment and the dosage I consider very important. First, they should be given in full doses, and secondly they should not be given alone but in association with bromide. I am in the habit of giving sodium salicylate ten to twenty grains, together with sodium bromide twenty to thirty grains, every four hours. If the precaution be taken to dilute the dose thoroughly it is well borne by the stomach. It is of the utmost importance to make a massive impression with the salicylate in the first twenty-four to forty-eight hours, and in the average case the pain markedly lessens and even disappears promptly under these circumstances. Very soon the doses of sodium salicylate and sodium bromide can be diminished one-half, and rapidly discontinued altogether. If at the outset the pain is very severe, there is no objection to giving a quarter of a grain of morphine with one-hundredth of a grain of scopolamine hypodermically to secure sleep at night, but as a rule this is unnecessary.

For many years I have relied upon rest in bed together with the salicylate and bromide treatment, and this method has been attended by a remarkable degree of success. Before I learned to institute thorough rest —rest as nearly absolute as possible—and before I used the salicylates in massive doses, I was frequently compelled to resort to other measures. For a time it was a matter of almost routine practice in my clinic to make a series of interrupted burns over the course of the nerve with a Paquelin cautery. At other times cases resistant to treatment were treated by stretching the nerve by means of forced flexion of the extended leg over the abdomen, and this failing—which indeed was a common result —the case was submitted to Dr. Keen for operation. The operation consisted in freely exposing the nerve very much after the manner advocated by Renton and by Lewis and Taylor, and then gently stretching it. The results of this procedure were by no means always successful.

So satisfactory have been my results from rest and salicylates that quite a number of years have elapsed since I have submitted a case of sciatica to a surgical procedure. In applying rest, however, it is most important to bear in mind that if the rest be too prolonged, or if the limb be fixed in the same position for too long a time, contracture of the leg upon the thigh may result as a complication; this compli-

cation, I need hardly add, is distressing alike to the patient and the physician. As a matter of routine motion should be practiced from time to time at the hip, knee, and ankle, and as soon as practicable gentle massage should be instituted. Electricity of course may also be used.

Unfortunately many patients, unless the pain be very severe, resist going to bed, and it is these cases which prove both troublesome and unsatisfactory. Besides, if the sciatica has been long established, long neglected, the value of radical rest procedures may be much impaired.

Like other clinicians, I tried in former years a variety of remedies; among them, turpentine, arsenic, quinine, the iodides, and somewhat later antipyrin and phenacetine, but all alike with indifferent results. Abroad the value of absolute rest, combined with massive doses of salicylates, does not as yet seem to be appreciated. Various local forms of treatment are still recommended, more especially the injection or the infiltration of the tissues about the nerve with various solutions—*e.g.*, common salt solution, which can be used in large amounts and has at least the advantage of doing little harm. Among other substances used are perosmic acid, carbolic acid, antipyrin, and methylene blue. The solution used by Lange appears to make a very decided impression. Lange injects from 70 to 80 Cc. of a one-per-cent eucaine solution in an eight-per-cent solution of sodium chloride. Tropacocaine may also be used. Struempell and Mueller and P. Krause have used stovaine 0.1 to 0.2 per cent, 10 to 20 drops of suprarenin hydrochloride solution one to one thousand, together with distilled water sufficient to make 100 Cc. Injections of the Schleich solution have also been used, and, according to Falten, with durable results. Ossipow, Hay, and others have recently again affirmed the good results of sodium chloride infiltration. In some cases intraspinal injections have been practiced, and in others epidural[1] injections; thus Glimm has used with success epidural injections of the Schleich solution, while Albrecht has obtained good results from epidural sodium chloride injections. Leszynsky praises the results of the perineural injections with alcohol. Braun uses both epidural injections and local infiltration of the nerve with Schleich solution. Hay has more recently used intraneural injections of *B*-eucaine and common salt, while Laval freezes the tissues over the nerve with methyl chloride.

In my experience procedures such as these are rarely if ever indicated, but should I find that the measures I am at present using are inadequate in a given case of true sciatica, I would first give a trial to infiltration with common salt solution.

However, it is not, in my experience, cases of true sciatica which give rise to serious difficulties in treatment, but rather cases in which the pain in the sciatic distribution is symptomatic of trouble elsewhere. These cases are the ones in which obstinate persistence of pain often defies our best efforts. It becomes important at once to consider the causes that may be at work in a given case. These may be divided first into lesions of the sacral plexus, lesions of the cauda equina and roots; secondly, lesions of the bones or other structures in relation with the plexus, cauda, or roots; thirdly, tumors within the pelvis; and lastly, disease of the pelvic viscera. Obviously the successful treatment of a case of pain in the sciatic distribution from lesions elsewhere than in the nerve proper depends primarily upon the diagnosis. To begin, pain in the sacral plexus may arise from causes similar to those which give rise to a sciatica proper; rather infrequently such involvement coexists with the latter. If the plexus be involved in addition to the nerve, the pain must obviously involve other branches than the sciatic proper, and pain in such case is noted in the distribution of the small sciatic as well, namely, in the gluteal region, the perineum, the upper and inner aspects of the thighs, etc. Obviously such an involvement of the plexus cannot modify the plan of treatment primarily indicated for the sciatica itself.

Lesions of the sacral plexus the result of

[1] Injections through the sacrococcygeal ligament according to the method of Sicard and Cathelin. "Die epiduralen Injektionen durch Punktion des Sakralkanals," Deutsch von Strauss, Stuttgart, 1903.

disease of the bones or of the presence of tumors usually give rise to pain in the sciatic distribution very severe in character. Besides, the pain is not limited to the distribution of the great sciatic itself. Disease of bone or the presence of tumors must of course be determined by general methods of diagnosis, among which the skiagraph may play a useful part. Commonly the diagnosis is made without difficulty—*e.g.*, in the case of hip disease, osteomyelitis, sarcoma. This is true also for the most part of diseases of the pelvic viscera—*e.g.*, carcinoma of the rectum—the symptom group of which is usually dominant to that of an associated sciatic pain. Occasionally, however, pelvic disorders, at first sight obscure and apparently innocuous, such as a fibroid uterus with displacement, may be the cause of the pain, as in the case of a patient recently studied by Dr. Montgomery and myself. Even large fecal accumulations in a displaced colon are supposed to be an occasional cause. Among the very rare causes may be mentioned gonorrheal infections of the seminal vesicles. Finally we should bear in mind trauma of the sacral plexus as one of the rare accidents of instrumental delivery; at other times prolonged pressure of the fetal head seems to have been the exciting cause.

Lesions of the sacrum, vertebral column, tumors of the cauda equina, may all be attended by pain in the sciatic distribution, but a careful study of a given case usually reveals its true nature. As a rule cases in which the pain in the sciatic distribution is due to lesions elsewhere, and not to neuralgia or neuritis of the sciatic nerve itself, usually reveal this fact very readily. In the beginning, however, cases may be very obscure and may only yield the truth after an exhaustive exploration. Now and then a case, which is obviously not one of true sciatica, remains for a time and perhaps permanently impossible of solution. In this connection hysteria must be borne in mind, for this affection sometimes simulates sciatica so closely as to lead to error unless a very cautious study be made. Indeed, cases have been operated upon which subsequently proved to be purely hysterical.

A COMPARISON OF THE EFFECTS OF CAFFEINE AND STRYCHNINE ON MENTAL AND MOTOR EFFICIENCY.

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The physiological effects of caffeine and strychnine are given in all of the treatises on the action of drugs on the bodily processes. Although there is some difference of opinion concerning the details of their influence, their general effect on the nervous system seems to have been fairly well established. I say the general effect on the nervous system, because the exact seat of the action of these drugs, of strychnine especially, seems to be in dispute. For instance, there is a difference of opinion as to whether strychnine acts on the motor side of the cord, on the sensory side, or in the synaptic connections between them. Cushny[1] says that both drugs act on the whole nervous system, but not equally. Caffeine acts predominantly on the higher centers of the brain and affects the psychical functions. Strychnine affects the lower divisions of the nervous system predominantly—that is, the medulla and cord. He says further that all regions, where simple reflexes are controlled, are affected by strychnine. In speaking of strychnine, Dixon[2] says that there is comparatively little effect on the cerebrum as a result of strychnine administration. Even in fatal doses the intellect remains unclouded until death. Such statements might be greatly multiplied, but their citation would be out of place in this report. It may be said that, with certain differences in the details, there is general agreement that caffeine acts predominantly on the

[1] A. R. Cushny: Pharmacology and Therapeutics, or the Action of Drugs in Health and Disease. Philadelphia and New York, 1910, 198 ff.

[2] W. E. Dixon: Manual of Pharmacology, London, 1912, 115 ff.

higher centers of the nervous system, while strychnine acts predominantly on the lower centers. These conclusions have been reached in part as a result of experimental work in physiology, but for the greater part as a result of clinical observation. But the real question of importance both to psychology and to medicine seems to be still unanswered. For an eminent authority on the action of drugs has recently asked this question: "Does strychnine, which is often used interchangeably with caffeine as a nervous stimulant, make the wheels run easier as does caffeine, or simply act as a whip whereby the patient expends some energy and becomes thereby rapidly exhausted?"

The present report attempts to answer this question. It is a comparative study based on two researches, "The Influence of Caffeine on Mental and Motor Efficiency," by H. L. Hollingworth,[3] and "The Effects of Strychnine on Mental and Motor Efficiency," by A. T. Poffenberger, Jr.[4] It will not attempt a detailed description of the conditions, methods, and tests employed, nor a detailed statistical report of the results. For these the reader is referred to the above articles. Only such description will be given here as seems necessary for a survey of the comparative effects of the two drugs as shown by the two researches. No account of previous work in this field will be given, except as references to them may arise in the discussion. Suffice it to say that special effort was made to avoid the errors and pitfalls revealed by earlier works on drug action.

Both investigations were made in connection with the Psychological Laboratory of Columbia University, and the general plan in the two was almost identical, so that the results in the two cases may be compared without hesitation. The experiments consisted of a series of tests covering about forty days, and may be conveniently divided into two parts. The first part included a period of about four weeks, in which tests were given five times daily, and the second included several days, in which tests were given continuously for a period of about twelve hours. The first provided a study of the action of the drug over a rather long period of time, while the second provided opportunity for an intensive study of a single dose.

Although sixteen subjects took part in the caffeine experiment, these were arranged in groups which received the dose at a different time of day. Only that group, including five persons, which received the drug at the same time as the subjects in the strychnine test, namely, about two and one-half hours after lunch, will be used for comparative purposes. This period was the one found most favorable for study. Seven subjects took part in the strychnine experiment—two for a period of thirty days, and five others during a short series of tests devised for the purpose of verifying the results on the two subjects. In the first part of both experiments the schedule of doses was so arranged as to include both alternate drug and free days, and alternating groups of three days each. In the second part, tests were made continuously for twelve hours, on three days in the caffeine experiment and two days in the strychnine experiment.

In both cases the drug was administered in capsule form. The doses of caffeine varied in size from one to six grains, and those of strychnine were limited to one-thirtieth and one-twentieth grain of strychnine sulphate. Larger doses of the latter were considered inadvisable. Independent analyses of the drugs were made and favorable reports as to quantity and quality were received. Control capsules were prepared from milk-sugar and were indistinguishable in appearance and taste from those containing the drugs. A capsule was taken every day, and the subject never knew whether he was receiving a control dose or a drug dose. This precaution is made necessary on account of the tremendous part played by suggestion wherever powerful drugs are known to be concerned.

In the groups of subjects I have mentioned the capsules were taken in the middle of the day, about two and one-half hours after lunch, when the stomach would be comparatively empty. In this way two

[3] *Archives of Psychology*, 1912, No. 22.
[4] *Am. Journ. of Psychology*, 1914.

tests were made each day before the capsule was taken and the others followed it. Those coming before served as a measure of the subjects' ability for that day, and those after it gave a measure of the drug effect. In the second part of the experiment the capsules were taken about the middle of the day, so as to have about half of the tests before and half after the dose.

The tests used were those standardized by long service in the Psychological Laboratory. They may be roughly divided into two groups, motor tests and mental tests, although this is intended to indicate only the predominance of the motor or mental element in the reaction. The motor tests measured the rapidity of movement of the arm, by what is known as the Tapping test; the accuracy and speed of the arm movements, by what is called the Coördination or Three-Hole test; and the muscular control of the arm when voluntarily held in a given position, called the Steadiness test. These three tests seem well adapted for measuring drug effects where they would be manifested in the loss of the delicate balance between opposing sets of muscles.

Two types of mental tests were employed, those measuring, first, Perception and Association, and secondly, Attention, Discrimination, and Judgment. Dr. Hollingworth[5] describes the first type as follows:

"Since thinking is so largely a matter of the association of ideas, a set of three simple association tests, representing different degrees of complexity, were chosen to represent this sort of mental process in the present experiment. These three degrees of complexity are fairly clearly recognized in daily life as well as in the classical laboratory experiments: (1) The names of the objects of our experience are associated with the direct perception, through some avenue of sensation, of the objects themselves (naming of colors). (2) Ideas are associated with other ideas, names with other names, words with other words (naming words having an opposite meaning from a given list of words). (3) Tasks of a more or less specific character are associated with ideas which will handle or solve them effectively (adding a given number to each of a given list of two-place numbers)." The second set of mental tests measured the higher mental processes of attention, discrimination, and judgment. In the strychnine experiment only one of this class was used, the one which experience in the caffeine experiment showed to be the most useful. This was the cancellation test, in which a given number must be checked, as rapidly as possible, wherever it appears in a series of 1000 numbers. The task requires the combined processes of attention and discrimination, functions of vital importance in our daily intelligent behavior. In the caffeine experiment the additional tests of the higher mental processes were the size-weight illusion test, and the choice reaction, neither of which was found to give information varying much from that obtained in the cancellation test.

With this brief preliminary description the results of the two researches will be compared. In the tapping test Hollingworth found a clear stimulation about equal in degree for every size of dose and with each of the five subjects. Moreover, he found no after-effect of any kind following the stimulation. In the steadiness test there is a suggestion of unsteadiness with the smallest doses which becomes pronounced with the larger doses. Also, the larger the doses the more quickly does the unsteadiness develop. In the case of the coördination test there is an improvement with small doses and a disturbance with the larger doses for each of the five subjects.

In the color naming test, the simplest of the mental tests, there is a clear indication of stimulation for the whole range of doses employed. But in all of the cases the stimulation is more pronounced after the small than after the larger doses. In the opposites test there is a stimulation for all sized doses in the five subjects, but the stimulation appears rather late, namely, in the second test after the dose (two and one-half to three hours afterward). In general, the smaller doses produced the greatest stimulation. In the calculation test, four of the five subjects show stimulation, its amount increasing with the size of the dose. The

[5] *Am. Jour. of Psychology*, p. 16, 1914.

stimulation comes rather late and is still present at the close of the day. There is no evidence of a secondary depression. In the cancellation test, involving discrimination and attention, the smaller doses show a slight average retardation, while the larger doses yield a pronounced stimulation. There are differences among the subjects, however, in this test, a dose of a given size producing stimulation in some subjects and a retardation in others. The general tendency may be said to be stimulation. There is no positive statement concerning the persistence time or after-effects in the case of this test.

Concerning the general effects of caffeine, Hollingworth says that small doses do not affect the quality of sleep, but larger doses produce a marked impairment with most subjects. The effects are greatest in the group of subjects which we have chosen for comparison. In doses above four grains the men experience dizziness and headache, while in the women these effects were more pronounced, probably on account of the difference in body weight of the two sexes. The second part of the caffeine experiment, the intensive study, serves to confirm the results of the first part and to give further evidence of the absence of any depressing after-effect.

The results from the strychnine research are in striking contrast to the above mentioned effects of caffeine. In both the first and second parts of the experiment the results are, in general, negative—that is, there was neither a stimulation nor a retardation in any of the tests employed. An exception to this general conclusion may be made in the case of the steadiness test, where there was a tendency toward poorer records in all cases following strychnine administration. In the cases in which there is an apparent stimulation or retardation, the values are either so small that they might occur by chance, or when above their probable error they indicate opposite effects in the different subjects. A careful analysis of these cases shows that these results are due most probably to the influence of other factors than the drug. The stimulation and retardation in the caffeine tests were, it is to be remembered, clear-cut and unequivocal.

The negative character of these results suggested that the strychnine might for some unforeseen reason not have been absorbed into the system. In order to provide a check upon this possibility, several physiological tests were employed to give a measure of the strychnine action, namely, Pulse-rate test, Blood-pressure test, and Ergograph or Muscle Work test.[6] These tests were made every half-hour during two half days, four tests coming before and six after the dose was administered. All of the subjects except one or two showed a decrease in the pulse-rate[7] and an increase in the blood-pressure after the dose. In most of the subjects this change occurred within the first one and one-half hours afterward. The ergograph tests were not sufficiently long to induce a state of fatigue, and as strychnine has been found to increase muscular work by increasing the possible number of movements and not their extent, the ergograms were unsatisfactory as an indication of the influence of strychnine. However, the pulse-rate and blood-pressure records may be considered as a sufficient indication that the drug was absorbed and produced some physiological effect.

A possible explanation of the different action of caffeine and strychnine in these experiments may be found in the seat of their action in the nervous system. Authorities seem to agree that strychnine acts predominantly on the cord and medulla, the

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[6]The patellar reflex would have been a valuable measure, but no person skilled in conducting this test was available.

[7]The modern treatises on drug action differ concerning the influence of strychnine on the pulse-rate. Cushny (*loc. cit.*) says that it causes a decrease in the pulse-rate, while others, *e.g.*, Hare (A Textbook of Practical Therapeutics, 1912, Phila. and New York, 374 ff), says that it produces an increase in the pulse-rate. The complicated mechanism of inhibitors and accelerators controlling the heart-rate is sufficient cause for this difference of opinion. The effect of any drug upon the heart-rate can be determined only when all other disturbing factors have been eliminated—*i.e.*, when the individual is in a condition of mental and bodily repose. For laboratory experiments seem to show that any sensory stimulation may affect the pulse-rate, in some cases increasing it and in some cases decreasing it. Again, the change in pulse-rate may be a secondary reaction to the drug, depending upon the change in blood-pressure, an increase in blood-pressure being followed by a compensatory decrease in pulse-rate. The decreased pulse-rate, therefore, found in the present test after a dose of strychnine is valid only for the given circumstances—that is, in normal subjects about to undergo certain mental tests. Under these circumstances, and in connection with the change in blood-pressure, this retarded pulse is considered an indication of strychnine effect.

region of reflexes, while caffeine acts predominantly upon the centers in the cerebrum. Naturally a heavy dose of either drug would tend to disturb the nervous system generally, but ordinary doses would show their effect on the most susceptible regions. Thus, a dose of strychnine would increase the reflex irritability of the lower centers, especially where these centers were below normal in this respect. And it is in just such a case that we should look for the most pronounced effect. What influence would this change in irritability have upon the functions tested by the caffeine and strychnine experiments? On the mental processes there would be only that effect resulting from the slight change in blood supply to the brain; and on the motor processes there would be only that due to the artificial increase in reflex tonus of the muscles concerned, an effect which would show itself in the postponement of fatigue beyond the point where the centers would ordinarily lose their irritability. This fatigue effect, as was stated above, was not measured in the two experiments. Another possible effect on the motor processes would be the disturbance of movement by the involuntary twitching ofthe muscles. Although such twitches did occur in the course of the tests, they were so infrequent as to produce no measurable results. Caffeine, affecting the cerebral centers, should show its influence in all voluntarily controlled processes, and just such effect was noted. Finally, it is difficult to understand what physiological effect either of these drugs would have upon the nervous system, other than a facilitation or a retardation of conduction through specific synaptic connections. The vast difference between the number of such connections involved in processes mediated through the cerebrum and affected by caffeine, and those mediated through the lower centers alone and affected by strychnine, would be sufficient to account for the results in the caffeine experiment, and their absence in the strychnine experiment.

The conclusions stated in this paper are not such as to modify the two principal uses of strychnine in therapeutics, namely, for a general tonic acting upon the digestive processes, and for increasing the reflex irritability of the lower centers, those of the medulla and cord. But it should not be considered equally efficient with caffeine in its influence on such voluntarily controlled processes as were studied in these experiments. Furthermore, the rather prevalent use of strychnine among brain workers as a mental stimulant finds no support in the conclusions from these researches.

THE TREATMENT OF PULMONARY COMPLICATIONS FOLLOWING SURGICAL PROCEDURES BY ADRENALIN AND OXYGEN.

Dr. Fritz Demmer (*Deutsche Zeitschr. f. Chirur.*, 1913, p. 257) advocates the use of oxygen-adrenalin inhalations in the treatment of catarrhal and pulmonary complications in surgical diseases. The most important deductions to be derived from his experiences with this treatment are, that with the Spiess-Draeger atomizer the vapors of a fluid medication are capable of reaching the most deep-seated air-passages, the oxygen-adrenalin therapy combining improved active inhalations of oxygen with the specific action of adrenalin.

The influence of adrenalin on the bronchioles is based on (*a*) the acute anemia of the mucous membrane (resolution), (*b*) the secondary vascular paralysis associated with serous exudations, (*c*) the variations in pressure in the pulmonary circulation, by which the latter is increased. Furthermore, oxygen-adrenalin acts directly on the most minute ramifications of the bronchial tubes, and the temporary resolution in the tubes benefits the peribronchial and lobular infiltration processes. The resolvent qualities of adrenalin act favorably on bronchial asthma during an attack. The unpleasant after-effects of ether narcosis may be avoided by oxygen-adrenalin inhalations as a prophylactic. This last statement the author makes with all due reserve since the experiments in this direction are still incomplete.

Technique.—The atomizer which may be attached to the oxygen cylinder with about

140 atmospheric pressure consists of three parts—the manometer, the glass container, and the outlet (U-shaped glass receptacle). Only enough of the mixture, an oily preparation of adrenalin inhalant (P. D. & Co.), is poured into the glass container to allow the atomizing tube just to dip into it.

The dose is:

Adrenalin solution, 15 to 25 drops;
Adrenalin inhalant, 25 drops;
Physiol. salt sol., 10 grammes;
Sterilized olive oil, 10 grammes;
Mentholated alcohol, 10 per cent, 10 to 15 drops;
Oil pinus pumilio, 10 to 15 drops, or menthol vaselin oil, 5 per cent, 10 grammes.
Always prepare freshly.

Since adrenalin solution decomposes very readily in daylight (appearance of red coloring in fifteen to twenty-five minutes) it is imperative that fresh solutions be prepared as soon as this change appears. A series of patients are allowed to inhale the vapors for about fifteen minutes, or until the fluid becomes colored. It is also important that the mask be in good condition and that the nickel parts of the tubes be kept bright, for adrenalin also decomposes when brought in contact with metals.

The inhalation time for each patient was from three to five minutes, never more than five minutes, and repeated every one-half to one hour. Three five-minute inhalations within two hours on the first day usually sufficed even in the most acute bronchial affections. It was found necessary to give an additional dose only in case of pronounced and prolonged dyspnea.

The apparatus should be thoroughly tested before using. Fill the glass container (which has been cleaned with alcohol and benzine) with the solution and insert the tube of the atomizer; then open the oxygen cylinder; turn the screw of the pressure bulb and insert the tube of the atomizer by turning the screw of the outlet. This sequence must be adhered to, since the high pressure (140) might possibly injure the manometer or the pressure indicator. The vapors begin to appear in from ten to twenty seconds first in the glass container, then in the tube of the drain, and, finally, they are seen issuing from the mask at the rate of about four to six liters per minute. This rate should be reduced (by turning the screw of the pressure indicator) until the vapor coming from the mask is just visible —*i.e.*, 2 to 4 liters per minute.

The patient should be in an easy "active" position, so as to permit free movement of the thorax and deep inhalations. An attendant should always be present to keep an eye on the apparatus as well as on the patient.

THE PREPARATION OF ALBUMIN MILK IN THE HOME.

In the *Journal of the American Medical Association* of November 15, 1913, BRADY gives the following directions in detail:

1. Bring a quart of sweet whole milk to the boiling point; raw milk is not used as its curd is much tougher.

2. Cool to 100° F.

3. Add one tablespoonful essence of pepsin and allow to curdle.

4. Pour off the whey and suspend curds in muslin bag for two hours.

5. Stand bag containing curds in 8 ounces of boiled cool water for one hour. This is very important and is the secret to the success which has been had in the preparation of this food.

6. Remove the bag from the water, allow as much water to drip as will, and place curds in sieve.

7. Add one pint of fat-free buttermilk to sieve containing the curds, and stir; it will be found that the curds will pass through in two to three minutes, which must be repeated three or four times.

8. Turn the bag inside out and return to the 8 ounces of water so as to obtain all the curd.

9. Pour in the sieve the 8 ounces of water which was used to soak the curds.

10. Add enough water so that the whole measures a quart.

11. Add the percentage of maltose-dextrin desired and put on ice.

Ten quarts of this food may be prepared after the curds have drained and soaked in less than ten minutes with the minimum separation of the fat.

EDITORIAL.

THE NEW TREND IN THERAPEUTICS.

We have long been of the opinion that the day is not far distant when it will be discovered that many drugs which possess great power for good depend for their beneficial effects not so much upon their ability to stimulate or depress the circulation or the nervous system as upon their influence upon less obvious but nevertheless important functions of the body, as, for example, the changes in the production and circulation of lymph, in the activity of the phagocytes, in the production of opsonins, and possibly in the development of antitoxic bodies. Every clinician of large experience is fully aware of the fact that salicylic acid aids in the elimination of uric acid and that it seems to be destructive of the streptococcus rheumaticus, yet this knowledge in no way explains the excellent results that are obtained by its use in certain conditions of the eye, of the throat, and of the muscles. So, too, there can be no doubt that our use of quinine in the early stages of acute infections cannot be dependent upon any influence which it exercises upon the circulation, but rather upon its ability to enable the body to combat invading organisms when they first attack the patient. We have as other illustrations the as yet empirically used but nevertheless clinically active iodides and mercury, the effects of which upon the body may be as yet considered an unexplored realm of therapeutics, no satisfactory explanation of their action having been brought forward.

Various researches are, however, beginning to throw a ray of light along a path which heretofore has been in darkness, and these researches have largely been along those lines which more or less directly ended in the development of salvarsan and neosalvarsan. Only a few years ago it was commonly believed that it was impossible to administer a drug which would destroy invading bacteria, or other parasites, without also destroying the more delicate protoplasm of the host. This belief is to-day on a stronger basis than ever before, and chemotherapy, as it has been called, is showing us on the one hand the correctness of this view, and on the other that it is possible to introduce into the body substances which do not act directly upon invading organisms but which stimulate the protective processes of the host or, by an indirect effect, render the invading germs more vulnerable to the mechanism of protection. Thus, the observations of Wolferston, Thomas and Uhlenhuth proved that atoxyl when it destroys trypanozomes or spirochætæ does not do so by any direct action, since it failed to destroy them if it was placed with them in a test-tube, whereas in the body it is an active factor. Ehrlich himself apparently was of the opinion that salvarsan acted directly upon the spirochæta of syphilis, but he now accepts the view that this is not the case and that the salvarsan develops antibodies, thereby aiding the body in protecting itself from disease.

It is interesting in this connection to note that a number of investigators seem at times to have been on the threshold of an important discovery without crossing the threshold. Thus, Blumenthal noted the difference of atoxyl in and out of the body, and thought that there might be in it some slumbering or unknown antitoxic or antiseptic substance, or that the aniline dyes which were so efficient in destroying the trypanosome might contain some such unknown factor. His views were doomed to disappointment, but it is worth noting that although this was his point of view in 1908, in 1912 he claimed that all substances previously tested and thrown aside as useless must again be fully investigated—not from the standpoint of direct bacterial effects, but to determine whether they do not in the body, or in the presence of blood serum, develop a second factor which is directly concerned in the destruction of the pathogenic germ. Furthermore, Morganroth and Jacoby in 1912 showed that quinine, and its

derivatives, had bacterial action on pneumococci in the body, although they had no such influence upon this organism when placed in a test-tube. Franz Blumenthal has shown that corrosive sublimate is highly toxic for spirochætæ *in vitro*, but of little value in syphilis in rabbits; that the aromatic compounds of mercury, while entirely devoid of bactericidal properties *in vitro*, nevertheless have powerful therapeutic activities *in vivo*.

These results not only emphasize the importance of differentiating between these two methods of testing, but also indicate that when a drug fails to act as a bactericidal substance in one animal it does not necessarily prove that it will fail to act in another animal or in man, a reasoning which is supported by Neisser and others, who have shown that certain mercurial compounds which are active in the destruction of the spirochæta in man have much less effect in animals than do some preparations of arsenic. This is of interest by reason of the fact already known, and well recognized, that the vaunted salvarsan, an arsenical compound, which is so active in destroying parasites in animals, must be supported by mercury if it is to be thoroughly successful in destroying spirochætæ in mankind.

This important subject is summed up in a most interesting manner in a brief article which is contributed to the *Edinburgh Medical Journal* for December, 1913, by Dr. John Eason, and to which our readers are referred for his original remarks. Thus he points out, going still further along the line we have indicated, that the toxicity of the salicyl preparations toward the streptococcus in animals is very slight, whereas it would seem that there are good reasons for believing that they are very efficient in man. All of this means that when a remedy has been found therapeutically active and is tested in the laboratory upon an animal in an experiment and proved useless, it does not necessarily follow that the original observation at the bedside is inaccurate. On the other hand, there can be no doubt that animal experiments are essential in pioneer work in order that human beings may be protected from the effects of powerful agents which are proved by experiments upon animals to be toxic to all higher forms of protoplasm.

As illustrating the extent to which protective processes in living bodies may be stimulated by the introduction of chemical substances, it is interesting to note that Böhnke has shown that in animals previously treated with diphtheria toxin the formation of antibodies increases greatly when salvarsan is administered, and he also found in animals infected with the meningococcus that the amount of bactericidal bodies increased seventeen times more in animals previously treated with salvarsan than in animals that did not receive this drug.

Another very important line of thought is advanced by Blumenthal in connection with the influence of the liver and the effects of mercury in infections. We have long known that the liver is an important factor in the destruction of poisons arising in the body, but Blumenthal thinks that when mercury is given this drug mobilizes in the liver protective substances which directly or indirectly affect invading parasites, and in support of his view he points out that all mercurial combinations so far found active in the treatment of syphilis are fixed in the liver, while those which are not so fixed are of no value in its treatment.

So far it will be noted that the substances discussed seem to act by producing antibodies or opsonins, but Eason quotes Rosenstein, Wolff-Eisner and others who have proved that silver produces a hyperleucocytosis, thereby providing more leucocytes for phagocytosis or more leucocytes for the production of protective bodies.

It would seem that at the present time many of our therapeutic views are of necessity almost as crude as were those concerning the circulation of the blood before Harvey's epoch-making discoveries, and it is quite possible that within the lifetime of many readers of the GAZETTE further investigations will place not only new remedies in our hands but show us how old

remedies, well-tried and reliable, but still employed empirically, really produce their good results.

CLINICAL EXPERIENCE AND LABORATORY DEDUCTION.

There are few men in American medicine who have added more to our therapeutic armamentarium during the last ten or fifteen years than Meltzer. His work on intratracheal anesthesia, the use of magnesium sulphate in tetanus as a palliative remedy, and his studies upon the action of purgative salts, have all possessed the qualities of scientific investigation and important application in practice. Indeed, it may be well said that he is one of the few men who have been successful not only in the laboratory but in the clinical application of laboratory facts. Some time ago in one of his interesting articles he penned the following pregnant sentences: "The trouble with men, trained exclusively in laboratories, is twofold: First, they do not seem to see that a medical fact, observed critically by a capable physician, deserves as much credence and consideration as a fact developed by laboratory methods; and, secondly, the laboratory man offers positive opinions in a field in which he has no experience."

These preliminary remarks lead to the main point of the present article. We have repeatedly deplored the tendency on the part of laboratory investigators to criticize and find fault with many measures resorted to by clinicians, the basis of the laboratory investigator's criticism being that there was no scientific reason for the belief of the clinician, and that there were in existence supposed facts which controverted his views. Not long ago we called attention to the fact that one pharmacologist claimed that the ammonium salts were useless in bronchitis, only to have it shown by another pharmacologist some months later that there was ample reason for the universal clinical belief on the part of clinicians as to the usefulness of these preparations in catarrhal conditions of mucous membranes, particularly in the respiratory tracts. We have called attention repeatedly to the fact that not infrequently the clinician is the pioneer who discovers that a remedy does good, only to have his discovery confirmed from a scientific standpoint by a laboratory investigator years afterward.

In this connection it is interesting to note that comparatively recently a number of papers have been published which have seemed to indicate that the various salts of tartaric acid exercise a deleterious influence upon the kidneys, and Pearce and Ringer describe striking changes in the convoluted tubules and in the loops of Henle produced by tartrates. So, too, Underhill and others have made reports on tartrate nephritis, so-called, and Salant and Smith have written on the toxicity of sodium tartrate. All this time, and for many years previously, physicians have been in the habit of employing various tartrates without noticing that they exercised any deleterious influence, but on the contrary have seemed to possess great power for good, particularly when the kidneys were not functionating properly. Fischer alone of the experimenters has had the temerity to intimate that tartrates are of value in the prevention of nephritis. Hundreds of thousands of individuals have also used the tartrates as they occur in baking powders, in Seidlitz powders, and in Rochelle salts, so that once again, as pointed out by the *Journal of the American Medical Association* of February 21, 1914, there is an apparent conflict between so-called scientific and practical experience. In this connection the quotation made from Meltzer seems peculiarly appropriate. Fortunately, for the sake of those of us who have used the tartrates largely, an investigator by the name of Post in the same issue of the *Journal* makes a valuable contribution to this subject in which he proves that Rochelle salts given in ordinary doses by the mouth to human subjects do not cause albuminuria or cylindruria, nor is there any evidence to show that the tartrates aggravate an existing nephritis.

Post emphasizes the fact that the doses used by those experimenters who have reached the conclusion that the tartrates are harmful have been so enormous as to be utterly impossible in practical medicine—that is to say, animals received a quantity of Rochelle salts equivalent to about half a pound for a man weighing 150 pounds. Once more the question of dose is the deciding factor in determining whether a substance is harmful or not. Although a distinquished supreme court has enunciated the surprising dictum that "once a poison always a poison," every medical man knows that such a statement is absurd. Too little attention has been paid to this question of dose in connection with the determination of the poisonous properties of a substance, and too little attention has been paid to the difference which must necessarily exist between the reaction of an animal and the reaction of a man. We have heard expert testimony in a court of law in which the doses of arsenic given to a guinea-pig weighing two pounds were in excess of doses which would be given to a man weighing 150 pounds, although the so-called expert seemingly believed that the results were identical. In still another instance where meat had been preserved by boric acid the laboratory investigator testified that the boric acid was harmful, basing his conclusions upon the appearance of the stomach and kidneys of rabbits, although it was shown, on cross-examination, that the only way in which he could get the chopped borated meat down the throat of the rabbit was by pushing it down with a pen-handle. An attempt to determine the effect of boric acid upon a mucous membrane by such methods in a rabbit is equivalent to forcing hay down the gullet of a man and then reporting upon the condition of the mucous membrane of his stomach.

The results of scientific investigations are, in the main, of such supreme importance that they should be encouraged by word of mouth, by the pen, and by financial assistance, but those who make these investigations should be most cautious how they apply them to clinical medicine, particularly if their results contradict clinical experience. Under these circumstances the burden of proof rests with the experimenter and not upon the bedside clinician, and opinions based upon theoretical deductions only cause the practicing physician to regard with suspicion all laboratory results.

RELAPSE IN MALARIAL INFECTION IN RELATION TO TREATMENT.

Those practitioners who see much of malarial infection are fully aware that a considerable number of cases relapse even when the action of quinine at the time of an attack seems to be satisfactory. Naturally relapses occur most frequently in untreated primary infections, and next most frequently in those which have been insufficiently treated, either because the dose of the quinine has been small, or because the disease has not been attacked with quinine until after it has existed a long time. Occasionally relapses occur even in those who have been most vigorously treated during a primary infection.

An interesting article dealing with this subject has recently been published by W. M. James, in the *Journal of Infectious Diseases,* May, 1913, who is convinced from his original investigations, covering three years, that there is but one primary cause of relapse, namely, a renewal of vitality on the part of the asexual cycle, and that this is true whether relapse takes place a week or a year after the original infection has subsided. In other words, a relapse, in his opinion, is not an occurrence apart from the original infection, but merely a manifestation of an infection which has not been eradicated; or, in other words, when a relapse occurs there has been a sudden, sharp increase in the number of parasites present in the blood. In proof of the vitality of the asexual cycle of the parasite he says it can be shown that it persists in sufficient quantities to be demonstrated in the peripheral blood for long apyretic periods, as, for example, six weeks

or longer. In much the same way that the spirochæta of syphilis has been shown to hide itself in the cerebrospinal system, where salvarsan cannot readily attack it, so it would seem that the malarial parasite, after being absent for long periods of time from the peripheral circulation, can nevertheless be found in the spleen and bone-marrow, even if quinine has been given by the mouth and by the hypodermic needle. Indeed, James believes that these areas are the favorite resting-places of the plasmodium in the human host, which probably accounts for the frequency with which we receive reports that no plasmodia are to be found in the peripheral circulation, and yet relapses occur. Deeks has suggested that quinine loses some of its toxicity for the malarial parasite by passing through the liver when it is administered by the mouth.

Finally, it is interesting to note several points which are emphasized by James. One is that the treatment of malaria by quinine in a patient in otherwise fairly good health is more efficient because the natural protective forces of the body aid the action of the quinine. He also emphasizes the fact that small doses of quinine, even if the infection is of the mildest type, serve only to render the asexual cycle relatively immune, so that larger doses ultimately become almost useless, although these large doses if administered at first would have been quite sufficient. In other words, the dose of quinine is not to be based upon the severity of the infection. It is to be given freely enough to thoroughly eradicate the disease. Furthermore, it is evident that when the patient has a condition of poor nutrition larger doses must be used than when he is in fair health, since the vital processes will not aid the quinine. Thus James, and Deeks, have found that whereas 20 grains on diagnosis and 10 grains three times a day for at least ten days are adequate in those who are well nourished, a larger dose of 45 grains per day is essential in those who are in poor condition. This is particularly essential in those who are not only infected by malaria but also by syphilis.

THE TREATMENT OF SPASTIC PARAPLEGIA.

This is a subject of interest to a large body of practitioners. Little (*British Medical Journal,* Nov. 1, 1913), in a paper on this subject, after alluding to the causes of the condition—*i.e.,* lesions from disease or developmental defect of the upper motor neuron affecting particularly the pyramidal tracts—notes that there are cases of hereditary or familial spastic paraplegia which are generally progressive and can only be temporarily improved by treatment. Pierre Marie considers that the centers in the cord constitute a mechanism always under pressure, the manifestations of which are always controlled and inhibited by the brain; hence it is clear that an interference with the paths of the inhibitory influences will release these manifestations, and that the spastic symptoms may be considered as a disorderly exaggeration of the normal muscular tone. Centripetal stimuli, whether sensory or other, are no longer controlled by the centrifugal inhibitory impulses, which either through central defects never originate, or, if originated, are unable to reach the anterior horns in the spinal cord. Hence the slightest centripetal stimulus in an extreme case will cause the most violent muscular contractions, not only of the muscle or muscles connected with its place of origin, but also of the whole muscle group, or of many groups of muscles in many parts of the body.

As Küttner puts it, the subcortical centers are continually spurred, but not bridled.

Treatment has for its end the restoration of the lost balance by interference at some point or points in the nerve or muscular condition or their combination. Clinically the manifestations of spastic palsy range from slight hypertension of a single large muscle to general rigidity of the limbs and some of the muscles of the trunk and neck. The immediate object of surgical treatment may be stated to be correction of deformity and abolition or diminution of spasm, with the ultimate end in view of enabling the patient to place the limbs in such a position

that he may use them properly. The sooner corrective training can be done the better. Of the proceedings tending to counter the effect of disordered nervous influence, manipulations, splints, etc., walking instruments, tenotomy, tenoplasty, tenectomy, tendon lengthening, myorrhexis, myotomy, arthrodesis, and osteotomy are indicated. Of the proceedings intended to prevent disordered nervous influence, neurotomy, complete or partial, alcohol injection of nerves, nerve transplantation, and rhizotomy are applicable. The latent powers are developed and improved by reëducation. Of the foot contractures, talipes equinus and varus, if structural shortening has not taken place, by persistent steady pressure of the hands the deformity may be overcome and the foot forced into dorsiflexion. It will then generally be found that the sole has become flat, and that the varus deformity has been converted temporarily into a valgus.

Concerning operation on the nerves, rhizotomy, or Foerster's operation, seems to be the one of greatest promise. This operation aims at breaking through or weakening the sensory arc of the reflex circle, upon whose integrity the spasm depends. Unlike most of the other proceedings, it leaves the motor impulses and their paths and the muscles themselves untouched. Operations may be by one or two stages, and the nerve roots may be identified and located either near their exit from the canal or at their origin from the conus medullaris. Although the nerve roots may be readily identified near their exit from the canal, it is by no means easy to distinguish the posterior from the anterior roots; this might be facilitated by electrical tests. If the section be made near the origins of the nerves from the conus, though the posterior may readily be distinguished from the anterior roots, it is not easy to identify the individual roots. As a mistake in the latter case is less serious than in the former, the approach is to be preferred which exposes the nerves near their origin in the conus. Following the operation there is usually acute pain and hyperesthesia, which pass off as the central ends of the nerve roots degenerate.

Thus far there is not much evidence as to whether spinal degeneration of the cord may be expected. The operation is only justifiable in the worst cases, where the patient is not idiotic, where there is not much athetosis or epilepsy, and where other treatment is hopeless. Under any circumstances reëducation constitutes an important part of the treatment; this reëducation of muscles and will must be constant, patient, persevering, and measured in time more by years than by months.

This timely contribution showing the limitations of the operative procedure and the subordinate part it plays in the restoration of function should serve as a deterrent to the enthusiast who adopts the latest surgical novelty without full knowledge of all that the operation implies concerning after-treatment.

SALVARSAN AND ITS FATALITIES.

One of the surprising features of the newer arsenical preparations employed in the treatment of syphilis is their safety considering the large amount of the drug administered, and the hundreds of thousands of patients to whom it is administered, too often without a preliminary study of their vitality, and in entire ignorance of what is now regarded as a proper technique. Accidents resulting from this treatment are extremely rare. That all such accidents, indeed the greater number of them, become a part of medical literature cannot be believed. If they were frequent, however, the treatment which causes them would long since have been discarded.

In a report of salvarsan fatalities Wechselmann (*Urologic and Cutaneous Review*, December, 1913) has tabulated six deaths following the use of salvarsan subcutaneously. In none of these could a direct connection between death and salvarsan be established, since the patients concerned suffered from the severest involvements of vital organs, and the salvarsan was em-

ployed as a last resort in a bare hope of saving the patient's life.

Fifteen deaths are reported following intramuscular injections. Comparatively speaking, emboli often follow this method in contradistinction to their non-occurrence in the subcutaneous method. Yet none of these cases demonstrated any connection between salvarsan and death in the sense of a poisoning.

As to deaths after intravenous injection, it is, generally speaking, highly probable that those which occur in a short time, even within a few hours after the injection, can take place as the result of unnoticed errors. Suggesting this explanation, this is the circumstance, that such deaths are rarely, practically never, reported by physicians who have given many injections. Of the 25 cases collected by Wechselmann a large number exhibited post-mortem such lesions as would suggest that the arsenic played a very minor factor if any in the fatality. Ten cases are reported in which the death was attributed to the fact that the organs were so damaged by chronic alcoholism, syphilis, or mercury, that they were unable to normally eliminate the administered arsenic. The greatest number of these cases have been given the combined treatment. In one case there was a long interval between the last employment of mercury and the salvarsan injection, yet it is known that renal damage following the administration of mercury may be weeks or months in manifesting itself. The point of interest is the frequency with which chronic leptomeningitis is found in connection with other latent degenerations of an alcoholic nature.

There were 25 cases in which nephritis was present, in some instances of a toxic character, others of a syphilitic nature. In some instances nitrogenous retention of uremic substances was noted. In some anuria occurred. In others still the renal damage seemed to be of a mild character, or severe renal changes were found at autopsy, which were unsuspected during life because the urine was not examined with care.

There were cases of death after combined treatment following the second or later injections of salvarsan hard to explain, cases in which the urine remained free from albumin, but which died after one or two injections of salvarsan. These, however, are very few in number.

Six cases of acute yellow atrophy of the liver were reported in which the dependence of death upon salvarsan is highly probable. There were a number of cases without scientific worth because of inexact observation; and, finally, some ten cases in which the patients presented the evidences of a severe infection or were suffering from a serious chronic illness.

Wechselmann notes that in the literature of reported deaths there is formed a variegated group without showing a distinct type, and that only in the smallest number of these cases can death be attributed directly to salvarsan. The marked differences in the clinical pictures of fatal cases, among which encephalitis hemorrhagica is a frequent type, show that salvarsan, in so far as the greater number of cases are concerned, is but an indeterminate factor and not a distinct cause of death. Thus no uniform explanation fitting all cases can be given. A study of the fatalities shows how recklessly salvarsan was employed at first, and it is certain that many of the fatalities could have been avoided.

The fact that fatalities do occur enforces upon the physician giving the mercurial preparation the most accurate technique, a dose of the drug adapted to the individual case, careful examination of the urine, resorting to the most exact chemical and microscopical examinations, this particularly when the combined treatment is employed; the avoidance of the joint use of salvarsan and mercury in high dosage, the latter drug being given always after arsenic; careful consideration of every general reaction or rise of temperature following the use of salvarsan, endeavoring in each case when this reaction occurs to discover its cause.

Though Wechselmann has assembled many cases in literature, it is apparent to all who have had experience in dealing with

syphilis that in the great majority recorded by him the fatality is not attributable to the treatment. It is particularly the specialist who is familiar with the sudden or rapid death which occurs in syphilitics, with or without treatment, this being particularly the case in cerebrospinal manifestations of the disease. To him it is a recurring experience to have patients die during the few days or weeks in which preliminary studies of renal function are being made, and renal elimination is being encouraged before the administration of an active specific treatment. Though arsenic or mercury is in these cases unable to stay the fatal issue, it probably when given does not materially hasten it. It therefore remains true that given competent guidance salvarsan or neosalvarsan in small doses administered intravenously is a safe and efficient medication.

REPORTS ON THERAPEUTIC PROGRESS.

PITUITARY EXTRACT IN OBSTETRICAL PRACTICE.

The *Canadian Medical Association Journal* for September, 1913, contains an article by Watson on this subject. He reaches these conclusions:

Pituitary extract has a powerful effect in inducing and in strengthening uterine contractions.

The type of contractions induced is similar to that which occurs normally, although at first there may be a tendency to prolongation of the pains.

Such prolonged contractions result in slowing of the fetal heart, but the child is seldom in danger.

When given in the late part of the first and in the second stage of full-time labor the polarity of the uterine contractions is not interfered with, but in early abortions and early in the first stage a simultaneous spasm of the os may occur.

Its chief field of usefulness is in the first and second stages of labor, when there is delay due to feebleness of the pains, alone or when combined with other complications, such as malpositions of head, malpresentations, multiple pregnancy, slight narrowing of the pelvis, etc.

In the induction of abortion, in the treatment of abortion already in progress, and in incomplete abortion, its action is so uncertain that it is not to be recommended except in cases in which the os is widely dilated.

In the induction of premature labor its effects are uncertain, but if sufficient dosage be given they may be good.

In the induction of labor at full term and after better results are obtained than in premature cases.

It gives good results in many cases of postpartum hemorrhage, but is not superior to the various preparations of ergot. It has the power of sensitizing the uterus, so as to allow these preparations to act more powerfully, the combination being most effective.

It is a useful adjunct in the treatment of placenta previa, when employed in conjunction with rupture of the membranes, the use of hydrostatic dilators, or turning.

PREPARATION OF COMMON INFANT FOODS.

HUNT, in the *Boston Medical and Surgical Journal* of November 20, 1913, says the object of his paper is to place before the home, simple, time- and labor-saving methods for preparing several of the common infant foods, as well as a few words on the relative merits of the ingredients to be used.

Barley-water.—Three-quarters of an ounce of barley flour is added to one quart of cold water and boiled for twenty minutes. Then add water to make up the original amount, and strain the contents through several thicknesses of gauze. The flour when placed in water becomes lumpy, and

no amount of boiling will break up these masses. This difficulty may be overcome in two ways: First, a small amount of water may be added to the flour and thoroughly mixed, thus making a paste which will be nearly free from lumps. The second but better method is as follows: Partially submerge a fine wire strainer in the cold water to be used, pour the flour on the water in the strainer and stir gently with a spoon until the flour is in solution. The flour is quickly dissolved and the barley-water will be absolutely free from lumps.

Whey.—Heat fat-free milk (skimmed) to about 100° F., or if you have no thermometer, to a point when a drop on the back of the hand feels neither hot nor cold. Add enough rennet or essence of pepsin to form a junket-like mass. Stir well to break the mass as finely as possible, and allow to stand for ten minutes. Pour off the top and strain through several thicknesses of gauze. If the whey is to be added to milk or cream, it must be heated to 157° F. and immediately cooled to prevent the further action of the rennet. No "short cuts" are advisable in this method, but a word might be said to relieve the mental stress which arises when the color of the whey varies each time it is made. There are two reasons which might account for this change:

1. When made from milk which contains the minimum amount of fat and coagulated by practically pure rennet, the whey will be olive green in color. The greater the amount of fat present, the more yellow will be the whey. The percentage of fat in commercial skimmed milk or in whole milk skimmed at home is a variable quantity, hence the difference in the color of the whey. During this process of making whey the fats present in the milk adhere and settle with the curd, but when pressure is brought to bear on the mass, the small globules of fat are forced out and remain suspended in the liquid.

2. The action of the proprietary rennets differs according to the percentages of rennin, pepsin, and alcohol which they contain. Nearly all contain from eighteen to twenty per cent alcohol in the form of white wine. The curds formed by these rennets are soft, non-adherent, and many of the finer particles of casein remain in suspension and cannot be removed by repeated straining. Enough casein remains in the whey to give it a dirty yellow color. Allowing the whey to stand for two hours and then decanting it will tend to reduce the amount of casein. The powdered extract of P., D. & Co. or the liquid rennet from Walker-Gordon & Co. are excellent for making whey.

Buttermilk.—A pure culture of lactic acid bacilli is added to skimmed milk in an earthenware dish, and allowed to stand at about 70° F. for twenty-four hours, or until the casein is coagulated. Stir vigorously in a churn, or with a spoon or egg-beater, until the curd is very small, and then push the contents through a fine wire strainer with a spoon. If the buttermilk is too thick add a small amount of water. When the buttermilk is once made a small portion (about four ounces) may be used as the inoculating agent for the next supply to be made. In this way the original culture may be made to last from six to eight weeks. The quantity and action of the product made will vary but little. Add the four ounces of buttermilk to the fresh milk, incubate, and follow the above outline. Sometimes the milk will not coagulate although it may smell sour. Stirring gently with a spoon will often produce coagulation in a few minutes. The fat present will rise to the top, and when coagulated appears as a brownish-yellow scum which may be removed before the curd is broken up.

Eiweissmilch.—One quart of whole milk is heated to 190° F. for three minutes and then cooled to body temperature. Add essence of pepsin enough to coagulate all of the casein. Break up the curd with a fork or spoon and allow to settle. Heating the milk to a temperature of 190° F. changes the character of the calcium salts so that the curd formed by the addition of rennet will be soft, flocculent, and non-adherent.

The essence of pepsin is used instead of stronger rennets, so that the curd will remain soft. The precipitated casein is allowed to settle and the liquid part decanted. Straining the curd through linen or a wire strainer is impossible, because the curd is of such consistency that the meshes of the strainer are quickly obliterated so that no drainage takes place. After all of the liquid has been removed and only the curd remains, this precipitate may then be put into a wire strainer and the remaining portion of the whey allowed to drain off. This dry curd is then pushed through a fine wire strainer, by means of a spoon, into one pint of buttermilk and one pint of water. After the curd is strained into an empty dish, the particles quickly adhere and you have gained practically nothing by straining. This precipitate must be strained into liquid in order to make use of the colloidal action so that these particles will remain separated. The buttermilk, water, and curd is then strained again, put into glass jars or bottles and kept on the ice.

Precipitated Casein.—The process of making precipitated casein is exactly the same as that of eiweissmilch, with the exception that fat-free milk is used instead of whole milk and no buttermilk is added.

Milk-sugar.—A word might be said on lactose. Milk-sugar does not dissolve readily in cold water, therefore if the sugar be added to milk just before it is to be taken, the child does not get it at all if the bottle is not emptied, or gets it all at once in an undissolved condition with the last half-ounce or so of the feeding. To do away with this difficulty it is better to boil the sugar in a small amount of water, thus insuring a dissolved and sterile mixture. Milk-sugar becomes contaminated in the manufacture, and a bacteriological examination frequently shows the presence of many bacteria. Aerogenes capsulatus, the organism which causes fermented diarrhea, has often been found in the sugar, and several cases of intestinal infection have been traced to this source.

The above methods of preparing the several foods and the facts in regard to the important steps may be of benefit to those who are interested in the feeding of infants.

VACCINE THERAPY OF PERTUSSIS.

LUTTINGER, in the *Medical Record* of December 20, 1913, says: (1) Pertussis vaccine, used in ten cases of whooping-cough, apparently reduced the severity and shortened the duration of the disease. (2) To be effective the vaccine should be given in much larger doses and at shorter intervals than hitherto recommended. (3) A dose of 50,000,000 bacteria should be tested as a prophylactic.

THE RATIONAL TREATMENT OF ACNE PUSTULOSA, WITH SPECIAL REFERENCE TO THE BACTERINS.

SKILLERN, in the *Medical Record* of October 11, 1913, says that in his opinion the common cause of failure is the employment and reliance upon but one remedy. Success depends upon attacking the malady in several ways at the same time. In the first instance, dyspepsia, constipation, or anemia, if present, should be corrected. Start at the very portals of the digestive tract, and see that the patient has a good and complete set of teeth, and that the gums are in a healthy condition. Then instruct the patient to eat at regular intervals and to masticate his food thoroughly, even to Fletcherize. Stop excess of starches, sugar, and particularly fat (see Montgomery and Culver, *Journal of Cutaneous Diseases,* 1912, p. 319). Alcohol in any form is bad. This regimen excludes the use of fried food, candy, and pastry. Constipation should be corrected by establishing the habit of regular evacuation after breakfast each morning. Anemia, if present, is best combated by appropriate exercise in the open air, and the ingestion of raw egg three times daily, after or between meals. These methods, if persisted in, are better than the swilling of gallons of drugs. The usual directions of "regulate the diet, open the bowels, and exhibit such

and such a drug" are not specific enough. For instance, a patient with acne is not an invalid. What he most needs, in nine cases out of ten, is correction of faulty habits. He is physically capable of availing himself of many simple measures that a sick person confined to bed cannot begin to do. Acne is seldom seen in sailors or in others who lead an active outdoor life.

The local treatment may be summed up as follows: If possible, a few exposures to the *x*-ray to cause temporary suspension of sebaceous activity. Then express every visible comedo, thus nipping in the bud many future acne pustules. Facial massage may be of value. Puncture each pustule, and, after bathing in cold water, apply a small Bier cup. Afterward swab the lesion with a mixture of pure phenol 3 parts, camphor 2 parts (Abraham). Have the patient use a good boric acid soap (or, better, hand sapolio or Rainier soap) with tepid water on his face at least twice each day, and at night apply lotio alba (zinc sulphate, precipitated sulphur, and sulphureted potash, of each 20 to 40, rose water q. s. ad 100.0), rubbing in well. If too much irritation results, substitute a soothing application, as rose-water ointment, for a time. Finally, when in conjunction with the above measures a properly prepared autogenous vaccine is employed, in strong rather than weak doses, a permanent and fairly prompt cure may usually be promised. In those instances in which the staphylococcus predominates, it is well to start out with an autogenous staphylococcus vaccine, switching over to the bacillus acne suspensions later. While the carrying out of a successful plan of treatment is often taxing on the patience of both physician and patron, the results more than justify the labor expended.

Old acne scars and indurations, if superficial, may be improved by triweekly vibratory massage with the electric rubber cup. If deep nothing short of excision of the most conspicuous ones will suffice. After intradermal injections of a few minims of a 2-per-cent solution of novocaine with 1:3000 adrenalin, an elliptical incision is made with a sharp scalpel around the scar down to the subcutaneous fat. Careful approximation with an intradermal silkworm-gut suture results in an inconspicuous linear scar.

THE ACTION OF NITRITES AND DRUGS OF THE DIGITALIS GROUP ON THE ISOLATED CORONARY ARTERY.

VOEGTLIN and MACHT, in the *Journal of Pharmacology and Experimental Therapeutics* for September, 1913, make a report which may have direct clinical bearing, for they find that digitonin and digalen produce relaxation, while digitoxin, digitalin, and bufagin cause a constriction of the coronary arteries. It would seem that digitonin, which is a saponin-like body, is responsible for the relaxation produced by digalen and the infusion of digitalis, for it is known that the infusion of digitalis and digalen both contain that body. All the nitrites were also found to produce relaxation. And it was furthermore noted in their experiments that the two sets of drugs, the nitrites and digitalis-like bodies, can antagonize each other in their action. These facts are of importance from the clinical point of view. Although their experiments were with the isolated arterial strip, excluding all other factors present in the living body, work done on the physiology and pharmacology of circulation would seem to indicate that the action of the above drugs would be the same on the intact mammalian heart. Indeed, remembering the observations of Paul Maass, whom the authors quote in their paper, that the vasoconstrictors of the coronaries run in the vagus nerve, and knowing the powerful vagus action of digitoxin and bufagin, the coronary constriction if anything might be even accentuated in life. Whenever, therefore, coronary spasm is to be avoided or guarded against, it would be advisable to employ the digitonin-containing preparations, or simultaneously administer the nitrites. Furthermore, if angina pectoris is due, as is generally assumed, to spasm of the coronary

vessels, their results would certainly tend to explain the favorable action of the nitrites in coronary angina.

SPINAL ANESTHESIA IN GYNECOLOGY, OBSTETRICS, AND ABDOMINAL SURGERY.

BABCOCK, in the *Journal of the American Medical Association* of October 11, 1913, admits that spinal anesthesia is not a universal anesthetic measure, although it produces the greatest degree of muscle relaxation with the least protoplasmic disturbance. Even if skilfully administered it is probably more dangerous than a transient and light narcosis under ether or nitrous oxide oxygen, but safer than a prolonged narcosis with complete relaxation under ether or nitrous oxide oxygen.

Spinal anesthesia causes an earlier and more marked fall in blood-pressure than other anesthetics, with a slowing and weakening of the heart action, and should therefore be used with caution or avoided in conditions of marked hypotension of the circulatory system.

In certain cases in which alarming symptoms follow the inhalation of ether, spinal anesthesia may be used with success. Spinal anesthesia requires a more highly developed technique and a greater degree of watchful supervision than does the use of ether.

Certain sequelæ such as headache and abducens palsy indicate that faulty solutions have been injected; late spinal cord degenerations probably do not occur in man; but various cord and nerve lesions may be simulated in the neurotic or hysteric and attributed to the injection.

In abdominal surgery it may be selected when there is an acute pulmonary, severe cardiac, vascular or renal disease, especially when associated with a high blood-pressure. In conditions of acute peritoneal sepsis it is valuable. Against spastic or paralytic ileus it is a most potent agent and its use will often render operative intervention needless.

In malignant disease and for operations on large tumors, while not free from danger, it is at times safer than ether. It does not eliminate the danger of cardiac failure in operations for uterine fibroids.

In obstetrics it facilitates operative delivery, lessens hemorrhage, and reduces cardiac and pulmonary strain. In pulmonary tuberculosis it largely relieves the patient of the great danger of labor, the accentuation of the disease. In heart disease it relieves the patient of any strain on the heart tending to decompensation. For operative delivery during eclampsia it is especially desirable, giving relaxation and lowered blood-pressure without interference with elimination. In extra-uterine pregnancy it is efficient. Spinal anesthesia is relatively safer in the young and robust than in the enfeebled and toxic.

THE VACCINE TREATMENT OF TYPHOID FEVER.

WATTERS, in the *Medical Record* of September 20, 1913, says that after experience in the treatment of these cases during the past six years, and in the collection of his statistics, there are certain measures that can probably be improved. These may be given as follows:

The best results have been attained by preparing the vaccine from an old non-virulent culture that has been subcultured for years in connection with the Widal tests. A new culture is made from this and incubated for twelve hours. In the fall of 1909 a fresh culture taken directly from a patient was used for several months. The cases treated during this time were apparently entirely unaffected by it in any way, following the usual untreated course. It was here that three of his seven fatalities in regularly treated cases occurred—not caused by the vaccines, and not in any way affected by them.

In comparing his dosage with that of others, it seems probable that his may be increased to 100, 200, or possibly 500 million.

An early diagnosis of the disease is most important. This can often be first made by

blood culture, days before the Widal reaction appears. It is probable that every day gained in diagnosis, and hence in inception of the treatment, means several days gained in the duration of fever and appearance of convalescence.

The vaccines when properly used by an immunizer will do no harm in any stage of the disease or in a relapse. The earlier they are used, however, the greater may be the hopes of benefit therefrom.

A safe rule to remember is that the more severe the case, the smaller should be the dose. Amounts as small as one or two million have seemed to transform some most critical cases into convalescents.

The interval between doses is variable, averaging from two to four days. A dose or two administered after the temperature has reached normal will render relapses less frequent.

In conclusion, Watters states that the present paper is intended as a report of progress rather than as a final one. It will, therefore, be much appreciated if any one who reads it who has already used vaccines in the treatment of typhoid, or happens to do so within the next two or three years, or knows of any one who has done so, will send a report of such, whether good, bad, or indifferent. By this means it is hoped to obtain an even larger collection of cases and to draw conclusions correspondingly more valuable.

THE EFFECT OF ATOPHAN AND NOVATOPHAN ON THE ENDOGENOUS URIC ACID EXCRETION OF NORMAL MEN.

HASKINS, in the *Journal of Pharmacology and Experimental Therapeutics* for September, 1913, reports a research on this theme. While he does not wish to imply that it is safe to draw conclusions from so few experiments, yet it seems to him that the results under discussion point strongly toward the possibility that the main effect of atophan and novatophan is to drain uric acid out of the blood, leaving the uric acid content of the latter subnormal.

Just as his work was completed the paper of Folin and Lyman on the influence of atophan on uric acid elimination appeared. Folin's results are extremely interesting and valuable, since he was able to demonstrate distinct lowering of the uric acid content of the blood after atophan in one normal and in six gouty persons. His conclusion that atophan stimulates excretion of uric acid, and possibly selectively, seems to Haskins as likely to be correct.

THE TREATMENT OF DIABETES MELLITUS.

JOSLIN writes in the *Boston Medical and Surgical Journal* of September 4, 1913, on this subject:

Persistence in the treatment of diabetes mellitus is essential. Joslin has no hesitation in saying that the great majority of diabetic cases which do poorly can be explained by neglect on the part of the patient or physician in carrying out treatment. The treatment of diabetes does not demand unusual skill, but faithfulness is a *sine qua non*.

The simplicity of the treatment of diabetes deserves emphasis. It is common to hear physicians say that the diet is too complicated and that they know little about it. This is a great mistake, and physicians and patients suffer equally thereby. Most of the trouble arises because the physician does not have his records in accessible form. Few data are required—in fact the essential data are simply the total quantity of carbohydrate in the diet, and the total quantity of sugar in the urine, but it is essential that these data be in such a form that progress of the case can be watched from visit to visit. One can learn in fifteen minutes to calculate the carbohydrate in the diet, and the test for sugar is accurate and easily performed. One must know whether the patient assimilates a portion of the carbohydrate in the diet, that it shows a positive carbohydrate balance, or whether the patient excretes more sugar in the urine than was contained in the carbo-

hydrates given, that it shows a negative carbohydrate balance; in other words, whether the patient excretes not only all the sugar and starch he has eaten, but also a portion of the carbohydrate which has been formed out of protein. To render advice about treatment easy Joslin makes use of diabetic charts by which he can see at a glance the progress of the case.

Oatmeal is the most satisfactory of the carbohydrates which one can give to a diabetic patient. This is partly due to its physical form; thus a tablespoonful of cooked oatmeal contains only 6 grammes of carbohydrate, yet with it one can give a large quantity of cream or, if desired, of butter, and thus supply the patient with fat in a most agreeable form. Far more fat can be easily introduced into the diet by the use of oatmeal than in almost any other way. Furthermore, one or two tablespoonfuls of oatmeal at breakfast solves the diabetic meal breakfast problem, because the balance of the meal can easily be made up of coffee, bacon, and eggs. It is a great advantage for a diabetic patient to have a meal concerning which there need be no thought. His attention is sufficiently directed toward planning the diet for the remaining meals.

The mystery about von Noorden's oatmeal cure in the treatment of diabetes is still unsolved. Attempts have been made to explain it: first, by some specific body in the oatmeal which might act upon the liver or the general sugar metabolism; secondly, by the effect of the oatmeal upon the kidneys in rendering them less pervious to carbohydrate, and it is true that there is more to be said in favor of this explanation than of the former. Although the kidneys are apparently less pervious to carbohydrate when oatmeal is given in large quantities, this does not explain why the oatmeal is oxidized or why the oatmeal cure occasionally fails. The third explanation, that of Klotz and Rosenfeld that the carbohydrate of oatmeal is so quickly fermented in the intestine that it is not absorbed as sugar but rather as decomposition products of sugar, is an attractive theory, but this is not yet upon a satisfactory basis. But this fact is true about the peculiar working of the oatmeal diet: it contains a very small quantity of protein, and all the recent work has tended to confirm the early ideas of Contani and Naunyn that an excess of protein is disadvantageous to the diabetic patient. As proof of this Joslin cites the work of Klemperer, who showed that one of his patients, living upon a diet containing 10 grammes of protein, could take 150 grammes of grape-sugar and yet excrete only 31 grains of sugar in the urine. When the quantity of protein was raised to 60 grammes, the quantity of sugar in the urine rose to 37 grammes, and as soon as the protein was raised to 110 grammes daily, the quantity of sugar in the urine rose to 56 grammes. That the protein is of vegetable rather than of animal origin is also of significance. Another explanation lies in the fact that both before and following the oatmeal period the patient is upon a vegetable day, a day in which he is not only on a diet without protein but without carbohydrate as well, and still further is in a state of undernutrition.

As has been said above, starvation tends to rid the organism of excess of sugar and apparently favors the oxidation of the excess of sugar there is in the body. It is thus easy to see that any carbohydrate would be better tolerated following a period of starvation than at any other time. Undoubtedly there is more of a riddle in the oatmeal day than the above explanations suggest. In the work at the nutrition laboratory of the Carnegie Institute the question has forced itself upon Joslin—is the carbohydrate of the oatmeal actually oxidized? This can only be definitely proven by experiments with the respiratory apparatus. From the examinations of the urine upon oatmeal days it would appear that the oatmeal is oxidized, but from respiratory experiments conducted by Dr. Benedict and himself, they have rarely, if ever, been able to show this by a rise in the respiratory quotient.

Oatmeal days are occasionally advantageous in the treatment of severe diabetes, and though it is true that other forms of carbohydrate act somewhat similarly, Joslin believes that if one wishes to try carbohydrate days at all, it is better to use oatmeal. As we are aware, von Noorden showed that if a patient had two or three vegetable days he could then take large quantities of oatmeal, 250 grammes, together with an equal quantity of butter for two or three days, and yet in the favorable cases the carbohydrate of the oatmeal would apparently be retained in the body and burned. Following the oatmeal period two or three vegetable days were prescribed. All of us have seen the advantage of such days. But we now know that it is not necessary to give so much oatmeal, and, indeed, in the severer cases it is often desirable to give less. It has also been shown that protein can be given with the oatmeal in the form of vegetable albumen without harm to the patient, and that in some cases egg-albumen would be tolerated. All agree, however, that animal albumen—meat—must be excluded.

The effects of the oatmeal are sometimes magical. Whereas the patient has had large quantities of sugar in the urine, and under systematic diet has not become sugar-free, with the oatmeal cure of two vegetable days, two oatmeal days, and two vegetable days the urine becomes free from sugar. On the other hand, not infrequently this happy result fails to occur. It is true that a repetition of an oatmeal period after an interval of a week or more may bring the good result desired, but occasionally it does not. The disadvantage of an oatmeal day in the opinion of Joslin lies not so much in the possible indigestion which may result or in the dislike which the patient may acquire for oatmeal and butter, but rather in the fact that the patient is taken off his beaten path of treatment, and is allowed a large quantity of carbohydrate which he has been told is harmful. He often fails to see why, if a large quantity of carbohydrate at one time can be taken with impunity, it will do harm at another. His faith in the strict diabetic diet is unsettled. Furthermore, he is doubtful of the desirability of using the oatmeal cure except in rare cases, because it necessitates very close observation of the patient, and his attention is too much turned in upon himself. This is contrary to Joslin's idea of the treatment of diabetes. His aim is to place the patient upon a diet upon which he can live without loss of weight or strength, attend to his daily occupation, restricted though it may be, and yet not be confined to a hospital, or depend upon frequent visits to his physician. He believes thoroughly in the use of occasional oatmeal days in the very severe cases of diabetes, but he is always glad to get along without them.

The quantity of carbohydrate in the diet usually prescribed can be calculated from the diet chart, but the amount of carbohydrate in the foods most commonly used is as follows:

Food.		Weight of Carbohydrate, Grammes.
Cream—½ pint	240 Cc.	6
Oatmeal—one gill, dry	36 g.	24
One small orange or grape fruit		10
One small apple		15
Potatoes—two ounces	60 g.	12
Bread—one ounce	30 g.	18
Vegetables from 5 per cent, 6 per cent and 10 per cent groups eaten during 24 hours contain approximately		10

THE TREATMENT OF GONORRHEAL RHEUMATISM.

BROEMAN in the *Medical Review* for September, 1913, gives these directions:

At the onset the patient should receive a purgative of calomel to be followed by citrate of magnesia, or salts, or a dose of castor oil. He should be put on a light diet with plenty of liquids, such as soup, milk, alkaline waters, etc., avoiding stimulating articles of diet as tea, coffee and spices. Naturally all alcoholic drinks are contraindicated. The bowels should be kept regular and the patient should drink plenty of water, so that the kidneys act freely. If necessary a mild diuretic can be given, as

the old A. B. C. mixture, which consists of potassium acetate and citrate and bicarbonate of soda. Codeine or morphine should be given if necessary for the pain. Salol five grains, and antipyrin three grains, are given every three or four hours for the fever. The oil of gaultheria in doses of twenty drops three times a day, or potassium iodide, has been recommended. Aspirin, sodium salicylate, or ichthyol, the latter in five-grain doses, three to five times a day, may be tried.

The treatment of disease by the various serums, vaccines, and bacterial products is to-day an established method among the specialists, and will become general just as soon as the technique of production and introduction can be perfected. Every case of gonorrheal rheumatism should be treated at once with either the antigonococcic serum, gonococcic vaccine, or bacterial derivatives, known as phylacogens, whether they be stock or autogenous products. The dose, technique, and frequency of the injections naturally depend upon the case in hand, the resulting general and local reaction, and the product that is being used. The local reaction from the hypodermic injection consists of pain, swelling, and redness of the part. The general reaction, when severe, consists of a chill, fever, sweating, headache, diarrhea, etc. The combined bacterins seem to be more useful than the single strain cultures. The initial dose is between ten and twenty million, running the same up every second, third, or fourth day, until about fifty million are being given every second or third day. Improvement is usually noticed within a week or ten days, but the treatment should be continued until all the symptoms have subsided, which may take from four to six weeks.

The antigonococcic serum is given in a similar manner.

Phylacogens are neither "bacterial vaccines" nor "sera," but the sterile aqueous solutions of staphylococci, streptococcus pyogenes, bacillus pyocyaneus, diplococcus pneumoniæ, bacillus typhosus, bacillus coli communis, etc., planted in artificial media. These are known as the basic phylacogen, while the specific phylacogen contains an equal amount of the specific organism added to the basic phylacogen. The initial subcutaneous dose of the gonorrhea phylacogen is 5 Cc. This should be followed by 10 Cc. in twenty-four hours if the local and general reaction is not too severe. In some cases the dose is run up to 20 Cc. daily. The intravenous dose is from ½ to 5 Cc., administered daily. The rheumatism is usually relieved after from six to ten injections have been given. The results of the phylacogen seem to be very good, judging from the reports of those who have tried this new form of treatment.

ON THE TREATMENT OF DELIRIUM TREMENS BY THE SUBDURAL INJECTION OF SODIUM BROMIDE.

In the *Boston Medical and Surgical Journal* of October 30, 1913, KRAEMER tells us that during the past two years he has been using a form of treatment for delirium tremens in the wards of the Cincinnati Hospital that has given them such brilliant results that he deems it worthy of publication.

Pathologically delirium tremens presents a classic picture of cerebral edema. The amount of cerebrospinal fluid is increased to such an extent that one can readily withdraw through lumbar puncture 50 to 60 cubic centimeters. In a previous publication it was shown that this fluid is exceedingly toxic. Its injection into dogs brings on a rapid fall in blood-pressure. It has been known that the withdrawal of cerebrospinal fluid in cases of delirium tremens produced a temporary improvement which lasted for a few hours. What was sought for was some form of medication which might be directly introduced into the subarachnoid cavity after the withdrawal of the toxic fluid which would counteract the edema and act as a sedative. After some experimentation on the lower animals with various salts he found that sodium bromide would answer this purpose. It was found that a sterile one-per-cent solution of so-

dium bromide might be injected into the spinal canal of animals without immediate or remote harm to the nervous system of the animal. This knowledge was applied to the treatment of their cases of delirium tremens. He has used the treatment in a series of twenty cases and can vouch for its safety and efficacy.

The technique of the treatment consists in the withdrawal of cerebrospinal fluid through lumbar puncture in amounts as great as possible, namely, 50 to 60 cubic centimeters. The same amount of a sterile one-per-cent solution of sodium bromide is injected with a syringe. There is absolutely no danger from increased subdural pressure. This amount and even as high as 80 cubic centimeters of fluid have been injected into the subdural cavity in an interval of one minute without the least sign of increased intraspinal pressure. This salt—that is, the sodium bromide—is not toxic to the nervous system. The potassium salt must not be used since it is slightly irritating.

The patients as a rule show an immediate improvement, a lessened delirium within a few minutes after the injection. This immediate improvement, however, disappears after a short time, to be followed in from twelve to fifteen hours by a permanent disappearance of the delirium. Occasionally after a few days there may be a relapse, which is usually controlled by a repetition of the injection.

FURUNCULOSIS OF THE EXTERNAL AUDITORY CANAL—THE USE OF ALCOHOL AS A VALUABLE AID IN TREATMENT.

LOTHROP, in the *Boston Medical and Surgical Journal* of October 30, 1913, reminds us that the usual treatment has consisted of hot douches, wicks of carbolized glycerin and one or more incisions in the canal; but when one considers the etiology of the infection it becomes evident that prevention must accompany treatment of any existing furuncle. The cartilaginous canal is beset with an infinite number of hair follicles, any number of which can be infected by pyogenic bacteria from the discharges of the first boil or by a continuous bathing of pus from a discharging middle ear.

The main object of the treatment with alcohol is the constant sterilizing of the pus and canal wall, thus preventing reinfection. The technique is as follows: The canal is cleaned of cerumen, desquamation, discharge, foreign bodies, or polyps. A wick is now inserted into the canal, nearly to the drum membrane, completely filling the lumen. If there is no discharge cotton is used. If there is a discharge a gauze wick is used. If the canal lumen is partly closed by one or more distinct "ripe" furuncles these should first be incised and the pus evacuated. Any incision should be carefully made into the center of the furuncle, for if this is not done the pus does not escape and the patient is not relieved. In addition, there is danger of infecting a new area, and a perichondritis sometimes results from trauma to the cartilage. A probe point will often help to locate the center of a furuncle.

After being inserted snugly into the canal, the wick is saturated with alcohol, plain or with boric acid, and the patient is instructed to keep the wick wet by dropping alcohol upon it at frequent intervals. The wick should be removed daily by the physician and a fresh one inserted. Whenever a pocket of pus can be located it should be incised. After incision, the alcohol should be applied before the patient recovers from the anesthesia. The alcohol smarts on freshly cut or abraded surfaces with the first application, but gives very little discomfort at later applications.

Not only does the antiseptic action of the alcohol prevent more infection, but the saturated wick acts as a small poultice to the canal. If the inflammation has spread to the surrounding tissues, a poultice of a dilute sulphonaphthol solution over the auricle may be added to the above treatment.

Following this treatment by wicks saturated with alcohol, some of the early mild cases become abortive without surgical in-

cisions. If the pain is severe and no pus can be definitely located, it is better to administer an internal sedative and wait for the boil to become "ripe" and the pus to localize, rather than to make incisions at random. The canal should be moistened with alcohol for a time after apparent cure to insure against an immediate return of an infection.

PAIN AND SLEEPLESSNESS.

JONES, in the *Lancet* of September 6, 1913, in discussing this subject, says that the bromides are best given in single large doses rather than in small repeated ones, and are best administered in an alkalinized medium, as an adjuvant, such as a glass of milk. Strontium bromide may be used in preference to the potassium salt when there is heart weakness, and the sodium bromide when there is gastric irritation. The long-continued use of the bromides gives rise to a rash, as well as a weakened motility, stupor, and hebetude; to loss of memory, impairment of the intellect, and to mental torpor, but some of the dementia may pass off when the bromides are discontinued. Bromipin, an oily compound of bromide, in ½-drachm doses, is useful in sleeplessness, and for headache after epilepsy, or in sleeplessness connected with neurasthenia, as well as with some motor disturbances such as those of seasickness.

Cannabis indica is useful in sleeplessness associated with migraine, or with asthma, or with uterine spasm, and especially when combined with the bromides. It is apt to cause unpleasant hallucinations in some women. Scutellaria lateriflora in doses of 15 grains has been recommended as a cure for insomnia, epilepsy, and spasmodic nerve diseases. Piscidia—the bark of *Piscidia erythrina,* commonly called the Jamaica dogwood, a tree growing in the Antilles—has been greatly lauded as a remedy for insomnia and the pain of dysmenorrhea. It is said to act upon the sensory ganglia of the spinal cord—dose, 20 minims to 2 drachms of the liquid extract prepared by Parke, Davis & Co.

Chloroform has been used as a hypnotic both by inhalation and internally in the form of chloral. In the extreme restlessness and the excitement of epilepsy, when morphine in ordinary doses fails to produce effect and when the patient is rapidly becoming exhausted from loss of sleep, chloroform has been administered, and while the patient remained unconscious morphia was injected subcutaneously; long-continued sleep resulted, from which the patient woke up greatly refreshed, and from that time convalesced.

Hyoscyamine, in the form of hyoscine hydrobromide, and in doses of 1/100 to 1/50 grain, is used hypodermically, but rarely to produce sleep. It is very beneficial as a sedative in the restlessness of acute delirium, or the excitement of epileptic or hysterical cases. It acts quickly and upon the reflex centers, causing muscular paralysis; it dilates the pupil, causes dryness of the throat, quickens the pulse, and generally lowers the arterial pressure through stimulation of the vasodilator nerves. It should not be used for feeble cases, but only for strong, muscular persons, who must be calmed at once without waiting for the delay which accompanies the administration of other sedatives, such as chloral, the bromides, or sulphonal.

The methane, ethane, propane, and butane group are used extensively for their hypnotic effects and not as anodynes.

Sulphonal, tetronal, and trional are all comparatively insoluble powders, and are taken in doses varying from 10 to 30 grains. Sulphonal, which is tasteless and odorless, is the most often employed, and tetronal, which has a camphor taste, the least. The sulphonal group are cumulative in their action; muscular exercise diminishes their influence, so that to obtain full effect the patient should be kept in bed. Being almost insoluble in water, although less so in warm alcohol, their effect as hypnotics is stated to be due to their solubility in the lecithin or the cholesterine of the nerve-cell. Winterstein's experiments seem to suggest that all hypnotics are effective because of their deoxidizing powers over the lipoid material

of nerve cells, and, as stated, the hematoporphyrin found after taking sulphonal, which is a form of dioxidized hematin, would seem to support this view. Their action is certainly to disintegrate the red blood-corpuscles by breaking up the lecithin. Jones considers that sulphonal is a strong neuronic poison, probably disintegrating the lecithin of the nerve-cells. Sulphonal is believed to diminish the alkalinity of the blood. It should only be used for the sleeplessness of chronic cases.

The urea compounds are also useful, and veronal, adalin, proponal, and bromural, all of which are colorless and tasteless crystals, are of this group. Each of these is more soluble in hot water than the methane group and all are more soluble in alkalies, hence their effect is believed to be retarded until the intestinal juice has acted upon the drug. The urea groups are all more hypnotic in their effects than the methane or ethane groups. They are useful for the insomnia of restless nervous cases, those with anxiety and depression, which come on—as is usual in cases of melancholics—in the early hours of the morning. These compounds act quicker than do the sulphonal group, and their effects pass off sooner also.

Urethane, introduced by Schmiedeberg in 1885, given in 5-grain doses, is chemically ethyl carbonate. This is also of the urea group, and this class includes hedonal, which is given in 10- to 30-grain doses. Urethane is a very safe and useful hypnotic and is very soluble, more so than the other members of this group; the taste is not unlike that of nitrate of potassium, and, like it, urethane is also a diuretic. It can be given to children, and is occasionally given before an operation to supplement the anesthetic effects of chloroform. Jones asserts he has known it to produce calm and refreshing sleep with no unpleasant after-effects. It does not depress the respiratory or the circulatory system. It has the advantage over paraldehyde of being nearly tasteless. Its action as a pure hypnotic is quick and not too lasting, and the sleep induced is not too deep in character. Patients taking it wake up at slight noises, but quickly fall asleep again when interruption ceases, the sleep lasting from five to seven hours. Kraepelin and others agree that apart from causing sleep, urethane has no power to relieve pain, only acting as a pure hypnotic. Where there is a tendency to excitement or to restlessness urethane is inferior to paraldehyde. It is most effective in cases in which there is exhaustion or sleeplessness with a low state of nutrition, because the amide group gives the stimulation to the ammonia it contains. In the longer duration of its action as compared with paraldehyde it is, in Jones's opinion, preferable to it. It seems to act directly upon the cerebrum and it does not give rise to disturbing effects upon the digestive tract. It is, as a rule, well borne by patients, and the sleep which it causes more resembles normal physiological sleep than that obtained after the use of any other hypnotic. Jones used it largely years ago.

Some of the coal-tar derivatives other than those already named—hypnone, for instance (which chemically is acetophenone), introduced by Dujardin-Beaumetz, given in 1- to 5-minim doses—have been used as hypnotics when freely diluted. Hypnone is only stable in oil or in alcohol, and the taste strongly resembles that of bitter almonds, and in some cases it has quite failed to give sleep.

Hypnal in 10-grain doses has also been used as a sedative and a hypnotic. It is a recrystallized mixture of chloral and antipyrin. Turpentine has been used for sleeplessness in some cases of hysteroepilepsy with striking benefit, and belladonna combined with the bromides, when other remedies have failed, has been of use in epilepsy and sleeplessness resulting therefrom.

Amylene hydrate, or tertiary amyl alcohol, introduced by von Mering in 1887, is a colorless liquid, of pungent taste and odor, resembling a mixture of paraldehyde and camphor; it had been freely used as a hypnotic before paraldehyde came into common use. It is a comparatively safe hypnotic, although it weakens the respiration. Its hypnotic effects are those midway between chloral and paraldehyde. It is

quicker in its action than the latter and more transient in its effects. Jones used it largely some years ago in mental cases.

Luminal (one of the veronal group) by the mouth (3 to 5 grains) and luminal sodium subcutaneously have been used by one of Jones's colleagues in Claybury to relieve sleeplessness associated with malignant disease of the upper jaw, and it has acted when other drugs have failed.

Mr. Langford Moore, the pharmacist to St. Bartholomew's Hospital, has given the writer a list of the hypnotics and sedatives in most common use at that hospital, and in addition to opium, chloral, and the bromides they are paraldehyde, chloralamide, chloretone, urethane, pyramidon, sulphonal, and trional.

The chief aim in the relief of sleeplessness is to break the habit, and, as in other things, a slight change in the mode of life may do this. Dr. Johnson used to advocate change of air, and if this were not possible then a change of room, and if not this, then a change of bed! The hygiene of the bedroom must not be neglected—its temperature, the bed, bedding, and the pillow may all need attention. At times reading to sleep may soothe, at another hot drinks, and even a dose of peppermint water may send one to sleep when more specific remedies are not demanded. Although much has been written about the real physiological cause of sleep, we are yet far from understanding it.

LOCAL TREATMENT OF VINCENT'S ANGINA WITH SALVARSAN.

ROLLESTON, in the *Proceedings of the Royal Society of Medicine* for November, 1913, states that salvarsan was first used intravenously in Vincent's angina (Ehrlich, Gerber, Rumpel), but Citron, who has tried both methods, has found that direct application is much the most efficacious; the action of salvarsan on the buccal spirochætæ being only transitory when it is given intravenously. Though in some cases —*e.g.*, that which Rolleston last reported, a policeman suffering from diphtheria—Vincent's angina may be associated with considerable constitutional disturbance, in the present case the disease was entirely local. Active treatment, however, was required owing to the failure of other methods and the possibility of destruction of the uvula or even of fatal hemorrhage, of which Delsaux has recently recorded an example.

The local treatment of Vincent's angina by salvarsan may justly be described as simple, safe, and sure. An objection to its expense has been made. Thus Lebenthal states that a case of mercurial stomatitis so treated cost 10 fr. a day, that ten days were required before the cure was complete. In the present case the expense was considerably less, little more than two shillings' worth of the drug being used. After this patient had been discharged from the hospital Rolleston received a paper from Dr. Delsaux, of Brussels, who recommends a blood examination in every case of Vincent's angina as a guide to treatment. He urges that in cases in which anemia is pronounced intravenous injection should be associated with local applications of salvarsan. No examination of the blood was made in this case. Rolleston adds that a child who lost her uvula developed leucocythemia and died four months after her recovery from Vincent's angina.

Salvarsan has also been used topically in other localizations of Vincent's organisms—viz., ulceromembranous stomatitis (Roger), noma (Netter), mercurial stomatitis (Zilz, Le Blaye), and balanoposthitis (Roger)—as well as in other conditions unconnected with syphilis, such as soft chancre (Melun, Levy-Bing and Morin) and varicose ulcers (Levy-Bing and Duroeux).

THE AMMONIACAL DIAPER AND ITS CORRECTION.

In the *Archives of Pediatrics* for October, 1913, SOUTHWORTH has written a paper on this topic. He thinks we may assume that where, in gastrointestinal cases, in infants there is enough ammonia in the urine to reveal itself by its odor, there is also a loss of the fixed alkalies. These are

taken from the blood, but since the blood manages to maintain a pretty constant alkalinity, they must eventually be derived from the tissues. Therefore the less the available alkalies taken into the body, the greater the necessary abstraction of alkali from the tissues.

Our therapy of excessive ammonia excretion is, therefore, to be directed toward two ends: First, to prevent the improper formation of acids, and secondly, to prevent undue loss of alkalies. The latter (loss of alkalies) can be partially effected as a first step and further injury to the body averted by the immediate administration of alkalies by the month. A rather limited experience leads Southworth to believe that calcium, magnesium, and perhaps potassium, are better bases for our alkaline treatment than sodium. But the second and more fundamental and effective measure is to promote a better metabolism of the fats by reducing the amount with which the organism is called upon to cope. In short, the food we administer should, if possible, be such as to be fully digested and oxidized with the least formation of acid products.

The fact that in some serious cases of gastrointestinal disturbance even breast milk is not satisfactorily oxidized, makes the problem of producing suitable artificial feeding for these infants a more difficult one. In the better types of private cases—such as those related by Southworth—provided they have not been too long neglected, and especially if there has been a gross error in the amount of fat in the food mixture, administration of alkalies to saponify the excessive fatty acids and the reduction of the fat will often suffice. In hospital and neglected cases of longer standing the powers of absorption are reduced, the condition is more persistent, and unless the continued use of a completely fat-free milk effects a cure and can be made to furnish a sufficient nourishment, we may find it advisable, as did Keller, to employ a malt-soup mixture in which the relatively low fat is compensated by an abundance of readily absorbable carbohydrates.

The conclusion is practically justified that the detection of a noticeable ammoniacal odor upon the diapers of an infant, especially if the diaper has been recently removed, and the phenomenon is repeated, points to a definite disturbance of metabolism. Furthermore, this ammoniacal odor may be regarded to some extent as an index of the disturbance, since it tends to disappear when the food has been adjusted so as to allow of more perfect metabolism. For the present the fat of cow's milk seems to be the more frequent offender when given in excess of the normal capacity, or in cases of fat intolerance when given in excess of the individual's capacity.

More attention should be paid than formerly to the ammoniacal diaper as a clinical sign. The great desideratum in imparting to others the principles of infant feeding is to be able to point out definite indications for changes in the composition of the food. An odor of ammonia upon the diaper furnishes such indication, for it at once directs attention to a disturbance of metabolism, presumably traceable to an actual or relative overfeeding with the fat of cow's milk.

GENERAL TREATMENT OF HYPERPIESIS.

LLEWELLYN, in the *Australasian Medical Gazette* of October 11, 1913, discusses the subject of high blood-pressure. He points out that gastric neuroses or other gastric troubles may require special treatment, but restriction of proteins should begin at once. The amount of proteins allowed by the writer was, until he came into touch with Chittenden's work, determined by rough and ready methods. Restriction was carried out gradually and progressively, minimal diet being usually reached in four to six weeks. The proteins were decreased until the patient complained of "feeling weak," when moderate relaxation was allowed, usually by adding the yolk of one or more raw eggs to the daily diet. In general practice it is impossible to regulate the diet by exact methods. Muscular weakness is not by any means an ideal guide, for it may be insidious, so that a fair

margin of safety is advisable. A convenient plan is to follow Chittenden's advice, and allow about .85 gm. proteins per kilo of body weight per diem. (As a matter of fact, the keeping of the patient on an absolutely minimal diet would demand daily variations in the quantity of proteins in accordance with the varying demands of tissue activity. The tissues do not require proteins as a fuel, it is true, and increases in bodily activity should be mainly met by increases in carbohydrates and fats. Nevertheless, if the bodily activity increases on any particular day we have to make up for the breaking down of that increased amount of tissue whose index is the increase in the creatinin in the urine, as has been demonstrated by van Hoogenhuyze and Verploegh. A very interesting discussion upon tissue metabolism and the fate of proteins in the body will be found in Starling's "Principles of Human Physiology.")

As a dietary may easily be formulated with the aid of a table of food values, there is no necessity to give a complete list here. Some general remarks upon the dietetic treatment may be of use: (*a*) The proteins should, of course, be of varied character. Llewellyn has gradually come to the conclusion that, notwithstanding the bad reputation of "red" meats, the most valuable meat food is slightly underdone beef. He allows from one to two ounces of meat food (varying with the protein content) daily. The object of the physician should be to select mainly tasty foods which are rather bulky and of low protein content. Among vegetables and fruits the following are exceptionally useful: Cauliflower, celery (boiled), onions (boiled), vegetable marrow, the stems of silver beet (boiled), tomatoes, grapes, ripe peaches, bananas. Either boiled onions or boiled celery taken daily for a time appears to have a distinct value in producing a feeling of well-being, and the same may be said of grapes. Soups, broths, and meat extracts are absolutely forbidden. (*b*) The restriction of the proteins is sometimes followed by an abnormal appetite for carbohydrates. The patient should be enjoined to exercise some self-restraint, even at the expense of some of his surplus fatty tissue, and the craving will usually diminish after a week or two. The filling of the stomach to satisfaction is one of the commonest causes of sudden rise of blood-pressure accompanied by angina. One effect of the new routine is an increased capacity of the stomach to tolerate fatty foods. If the diet prescribed is too poor in carbohydrates or fats when the stomach is not filled to satisfaction, the patient will lose weight to an undesirable extent, and less bulky foods of higher caloric value but similar protein content must be substituted for some articles of the diet. (*c*) The taking of liquids with solids is strictly forbidden. A meal of solids and liquids is a far more potent factor, Llewellyn believes, in the production of anginal attacks than one of solids alone. No liquid should be taken until at least an hour after a meal. The total intake of liquids—even water—should be reduced steadily to a degree to be determined by the circumstances of the case. A cup of tea may be taken on arising in the morning, but the taking of solids apart from meals is not allowed. Alcohol is strictly forbidden in every case. If the patient has been long habituated to its use, the withdrawal is made gradually. (*d*) The use of common salt should be restricted, and no article of diet rich in potassium should be taken in large quantities. Rice is preferable to potatoes. (*e*) The withdrawal of proteins should usually be effected gradually. In a few cases in relatively good general condition, however, Llewellyn has made a big reduction forthwith and with no untoward results.

Exercise of the Voluntary Muscles.—Little need be said upon this subject. A walk should be taken by all patients who can undertake it with safety an hour before meals. It should be sufficiently brisk to put the patient somewhat out of breath, and, if possible, to induce perspiration. Where it is practicable, however, mountain climbing is the ideal exerise.

Massage and forced respiration may be employed where walking is impracticable, or even as an adjuvant thereto. Massage

should be general, special attention being given to the abdomen.

Relative Mental Rest.—Rarely should the busy man be taken from his work altogether, unless he is prepared to undertake a visit to where he may indulge in mountain climbing in the company of cheerful friends. Having nothing to do begets worry and habits of introspection; and symptoms which were disregarded in the stress and excitement of business are apt —especially as many of these patients present slight symptoms of neurasthenia—to be magnified out of all proportion to their seriousness when complete absence from work is enjoined. Mental work and painful emotions (as Mosso showed) constrict the vessels of the limbs and skin, and determine blood to the splanchnic area. We must choose a middle course for the patient by arranging for a reduction without a cessation of his work.

Warm Baths.—In the average case a warm bath at bedtime is well borne, is an excellent vasodilator, and tends to make the skin act, especially if the bed is warmed before the patient gets into it. Electric light baths are strongly recommended by some writers. Turkish baths are sometimes of considerable value.

Drug Treatment.—Llewellyn proposes to devote separate papers to the use of vasodilators as palliatives in hyperpiesis, and as special remedial agents in its complications. A few general observations may be made here, however. He begins treatment usually with sodium nitrate—in doses of ½ to 2 grains, according to the susceptibility of the patient's circulation to the drug's action. Eventually, if the case is not improving, he increases it up to 3 grains. If this dose produces no effect he tries erythrol tetranitrate, which is more powerful, and gives a much more prolonged action. In progressive cases, however, a stage is reached when, although there may be reason to believe that the fibrotic changes in the arteries are not extreme, vasodilators fail absolutely. In such cases he invariably recommends venesection. Gastric and intestinal antisepsis is a valuable measure in many cases, and is indicated always. Creosote is valuable at times, and also salol, but the most valuable standby, in the absence of evidence of parenchymatous kidney disease, is mercury combined with a vegetable aperient. He prescribed either pil. colocynth. comp. cum hyoscyamo or pil. hydrargyri, every third or fourth night at bedtime, for a few weeks, followed by temporary withdrawal for a week or two. He forbids magnesium sulphate altogether, partly because there is reason to believe that a proportion of the cases hitherto diagnosed as uremic coma have in reality been nothing more or less than magnesium poisoning, due to accumulation following the more or less sudden onset of parenchymatous kidney change. It is well to attempt to overcome the frequent tendency to constipation by the free use of onions and of raisins; and various vegetable aperients, *e.g.*, aloin and cascara, are sometimes useful.

Venesection.—Unfortunately in a large proportion of cases, some of these measures cannot be brought to bear. Llewellyn has had many gratifying results in hyperpiesis with drugs and dietetic and hygienic measures, particularly when, as is not by any means always the case, the patient and his friends will systematically and conscientiously carry out instructions. In some cases complete failure has, of course, been met with. Where the foregoing measures have failed, and the condition has been progressing, or even in some cases without waiting to give other treatment an extended trial, he has always endeavored, in the absence of contraindications, to get an opportunity to play his trump card, to wit, venesection.

Llewellyn's employment of venesection in hyperpiesis (even in cases in which, although there is arteriosclerosis, the arterial system is not altogether unresponsive to nitrates—*i.e.*, in the absence of the textbook indications for its use) is based upon data of physiology and pathology, of which most have been already alluded to in the present paper in connection with other matters. Experimental observations upon the effect of venesection upon the viscidity of

the blood must precede the publication of the rationale of the use of this measure. It may be mentioned that some of the results he has obtained have been brilliant, some moderately good, some disappointing. Llewellyn has, however, never regretted performing venesection in hyperpiesis, but has very often regretted that in cases in which it was clearly indicated (for there are, of course, definite contraindications) he was, owing to the prejudices of the patient or his friends, not given an opportunity of performing it before the patient was *in extremis*. That, by the way, is where the defect in the text-book teaching lies—the operation is recommended to be performed only when a stage has been reached in which failure is almost a foregone conclusion.

RESULTS OF STAPHYLOCOCCUS SPRAY TREATMENT IN FORTY-TWO CASES OF DIPHTHERIA CARRIERS.

WOMER, in the *Journal of the American Medical Association* of December 27, 1913, reaches the following conclusions:

1. The use of the spray caused no unpleasant symptoms.

2. The use of the spray did not appreciably lessen the period of quarantine.

3. The preparation and distribution of the spray entail a large amount of work if there are many cases.

4. Apparently most of the carriers do not spread the disease after sixty days from the day the disease begins.

5. Public health officials could work more effectively if they had some practical method of determining the virulence of diphtheria bacilli found in the throat of carriers.

CORPUS LUTEUM ORGANOTHERAPY IN CLINICAL PRACTICE.

DANNREUTHER, in the *Journal of the American Medical Association* of January 31, 1914, gives these indications for the use of corpus luteum extract:

Those who have employed corpus luteum (the fresh yellow body) or a desiccated extract of it, using proper discretion, have found that it is much more potent than the ovarian preparations and that its administration in suitable cases is followed by striking and gratifying results. The particular conditions for which it will be found serviceable and to which its use should be limited are: (1) Functional amenorrhea or scanty menstruation; (2) dysmenorrhea of ovarian origin; (3) manifestations of physiologic or artificial menopause, such as nervous or congestive disturbances of reflex origin (hot flashes, psychoneuroses, etc.); (4) "neurasthenic" symptoms during menstrual life; (5) sterility, not due to pyogenic infections or mechanical obstruction; (6) where the function of one ovary is impaired, or one ovary has been removed, and the compensatory activity of the other is insufficient; (7) repeated abortions, not due to disease or mechanical factors; and (8) hyperemesis in the early months of pregnancy.

It seems almost superfluous to mention that it would be useless to prescribe corpus luteum in cases such as amenorrhea due to extreme anemia, dysmenorrhea due to cervical stenosis, or all cases of sterility, but it is a fact that otherwise discerning practitioners have prescribed it for diverse gynecologic conditions with an equal disregard of its indications and without exercising their good judgment. Therefore, additional emphasis on the necessity for the proper selection of cases is essential in order that this useful preparation may not be unjustly discredited.

Dannreuther prescribes 5-grain capsules three times a day and has seldom had occasion to increase this quantity, although 10-grain doses have been necessary in certain instances. The potency of such amounts is almost a verification of the source of the extract. Under no circumstances would he prescribe the dosage that Burnam recommends, if it were certain that all extracts were made from the ovaries of pregnant animals. Dannreuther has nearly always observed a reduction of blood-pressure after a week's use of the 5-grain doses, and whenever the pressure drops too rapidly the patient is ordered to discontinue its use temporarily. Before the physician gives a

patient corpus luteum he should take a careful sphygmomanometric reading, and weekly readings thereafter. If the blood-pressure falls as much as 15 mm. the therapy should be stopped until 10 mm. of this loss has been recovered, when it may be cautiously resumed. At times, however, a decrease of even 15 mm. of blood-pressure would be beyond the limit of safety, as it should never be permitted to fall below 90 mm. Hg. under any circumstances. If these principles are accepted as a guide, corpus luteum organotherapy will not be followed by any untoward effects on the patient's circulatory apparatus. Another point of importance is the necessity for always getting a comparatively freshly made extract. Dannreuther would place the limit of time on its reliability after manufacture at about three months.

The cost of corpus luteum extract somewhat precludes its utilization in dispensary practice, so that the opportunities for its employment are to a certain extent restricted. Dannreuther's personal experience includes about eighty carefully selected cases, the greater number of which were encountered in private practice, and with few exceptions the results have been very encouraging.

All are familiar with the slightly obese, pale, and anemic type of young woman, who soon after puberty consults the physician because of headaches, malaise, nervousness, acne vulgaris, constipation, and scanty menstruation. While proper hygienic measures, arsenic and iron are of course of value, the conjoint administration of corpus luteum extract apparently promotes the menstrual flow and has a salutary effect on the general economy. In addition, Dannreuther has frequently noted a loss of the excess in weight and a marked improvement in tissue tonicity in these patients.

Cases of dysmenorrhea due to functional ovarian deficiency have been almost invariably relieved by corpus luteum. Dannreuther has seen a number of women suffering from this condition who had previously taken an ordinary corpus luteum extract without benefit, but who were subsequently relieved by an extract made from the ovaries of pregnant animals.

Climacteric symptoms, such as hot flashes, psychoses, vesical irritation, etc., due either to the physiologic or artificial menopause, may be prevented or readily controlled. In fact, the results in these cases are most striking of all. The efficiency of corpus luteum in such conditions has been demonstrated repeatedly, and it is a source of great satisfaction to both patient and physician to have these distressing symptoms promptly relieved, particularly after hydrotherapy, the valerianates, bromides, etc., have proved of no advantage. He would urge its administration as a routine measure in all cases approaching the menopause, and after hysterectomy and oöphorectomy, partial or complete. In two cases of pruritus vulvæ, associated with the menopause, the itching was so quickly alleviated by corpus luteum that it would almost indicate a selective action on the external genitalia.

Patients complaining of headaches, neuromuscular weakness, mental irritability, insomnia, and other variable and inconstant subjective symptoms, but in whom no pathologic cause can be determined, are frequently seen. Such instances of so-called "neurasthenia" occurring in women during menstrual life are but vague entities, to say the least, and are often really reflex manifestations of menstrual disturbance. It has recently been Dannreuther's privilege to observe an instructive case in this connection. The patient was a young woman, aged twenty-five, in excellent general health. She had had one miscarriage four years before she was seen, bore one child a year later, and had another miscarriage about a year after the child's birth. After both miscarriages she was curetted, and since the last curettage menstruation was scanty and body weight increased, and she became nervous, morose, and irritable. Pelvic examination revealed nothing abnormal at this time, notwithstanding which she was subjected to laparotomy for prolapsed ovary (?) by her physician. After this her condition became somewhat improved for a

short time, probably due to the psychic effect of the operation, but she soon lapsed into her former state. Two other gynecologists were then consulted, both of whom suggested "corpus luteum." The preparations prescribed failed to help her, and her condition remained about the same until a short time ago, when she consulted Dannreuther, and the use of an extract made from pregnant animals' ovaries was advised. From that time on she began to improve and all her unpleasant symptoms gradually cleared up. In short, this patient was a healthy, well-nourished young woman, in possession of normal pelvic organs, whose symptoms, attributable only to menstrual disturbance, were entirely relieved by a proper extract of corpus luteum, after other extracts were of no avail.

Most cases of sterility in women are due to gonococcal or other pyogenic infections, cervical stenosis, or some other local cause. Occasionally, however, examination of a patient shows nothing pathologic in the pelvis. Under such circumstances it would seem that corpus luteum should be of decided benefit, because of its theoretical promotion of pelvic hyperemia. For example, a married woman of thirty-one, in apparent good health, sought advice in March, 1913. She complained of scanty menstruation, prolonged intervals, and sterility. She had two children, but was anxious to conceive again. Corpus luteum extract, in full doses, promptly increased the quantity of her flow and reduced the intermenstrual interval to about twenty-six days. She became pregnant the following July. This, of course, may have been simply coincidence, and Dannreuther has not had the opportunity to prove otherwise by extensive experience with this class of cases, but it would appear that corpus luteum is not wholly without merit in enhancing the possibility of pregnancy in sterile women, particularly if used in conjunction with intrauterine negative galvanism.

When one ovary has been destroyed or removed, or its function impaired, there usually occurs a compensatory activity in the remaining or healthy ovary. As a rule, this is sufficient to counterbalance the deficiency, analogous to the ability of one kidney to increase its functional capacity under similar circumstances. But at times these supposedly and apparently healthy ovaries, for one reason or another, are incapable of assuming this added burden and fail to fulfil their mission. Corpus luteum is then indicated as a supplementary aid, and the results therefrom in these cases, with one exception, have been excellent. This exception was a young woman, a school-teacher, on whom Dannreuther operated some three years ago and removed a cirrhotic and hypertrophied ovary, containing a distinct cavity, lined with a false membrane, which had previously been the seat of an ovarian apoplexy, that had undergone spontaneous rupture and absorption. This patient exhibited all the nervous manifestations of an artificial menopause soon after her operation. She was put on corpus luteum extract and took it for a long time, but without effect, notwithstanding that her remaining ovary and all her other pelvic organs seemed to be normal at the time of operation. Her condition at the present time is but little improved, and this improvement followed the use of bromides and large doses of strychnine. In brief, the use of corpus luteum proved of no avail whatever, and this case constitutes a conspicuous failure.

One of two cases of repeated abortion, in which the cause was inexplicable, was carried to full-term labor by the use of corpus luteum extract. This patient had had eight abortions in six years of married life. She became pregnant in February, 1913, and was delivered of a healthy child the following November.

Corpus luteum will also be found of service in allaying the hyperemesis of early pregnancy. It has stood Dannreuther in good stead on several occasions.

Burnam stated in his paper that he had "attempted to produce menstruation in three patients in whom the ovaries had been removed but the uterus left in. All three were given enormous quantities of luteum, but not one of them showed any sign what-

ever of menstruation." From this he concludes that "when given by the mouth, even in very large quantity, the corpus luteum of the sow cannot entirely replace the normal function of the ovary of the woman, so far as to producing menstruation is concerned." Dannreuther has been fortunate enough to encounter a case controverting this evidence, and would suggest that had Burnam employed an extract prepared from the ovaries of pregnant animals only, he might have been favored with greater success in the cases he mentioned.

THE COMMON FORMS OF ALOPECIA AND THEIR TREATMENT.

DORE, in the *Clinical Journal* of January 21, 1914, writes on this topic. Concerning the subject of toxic alopecia and its treatment he says that the treatment of commencing baldness of the type we are considering is chiefly that of seborrhea, with which it is associated. If the seborrhea is a preponderating feature its removal will usually be followed by cessation of the hair fall, and in early and acute cases by regrowth. But it is important to remember that, as Sabouraud graphically puts it, there is a long pathological history behind each patient, and the hair, which has been completely destroyed by a slow and insidious process extending over many years, cannot be regained. In other words, we are paying the penalty for the neglect of the scalp in our youth and adolescence, when much might have been done to prevent the loss of hair. Another fact to be remembered is the inaccessibility and impermeability of the hair-follicles by drugs, so that the treatment of seborrhea is similar to that of ringworm, and no mere perfunctory dabbing on of a little lotion or ointment can be expected to eradicate what is really a deep-seated disease.

It would be impossible to refer to all the preparations that have been extolled for their hair-restoring properties. Dore only mentions a few he has found useful in practice. In seborrhea cases resorcin or salicylic acid, perchloride of mercury, sulphur, and tar are the best drugs. The last two are somewhat objectionable on account of their unpleasant odor, and are usually prescribed in the form of ointment. In the majority of cases a lotion is all that is required and is much preferred by the patient. A useful one is the following:

> Hydrarg. chlor. corrosivi, gr. ss-ij;
> Resorcin vel acidi salicylici, gr. v-x;
> Olei lavand., min. i-ij;
> Olei ricini vel glycerini, min. v-x;
> Spt. vini rect., q. s. ad f℥j.

If the scalp is dry the castor oil may be increased in quantity; if excessively greasy a solvent of fat such as ether or acetone may be added. A spirit lotion is the best dressing for the hair of women; in men, water or weak spirit with glycerin instead of castor oil is sometimes preferable. Resorcin discolors white or very fair hair, and salicylic acid should then be substituted. Euresol, the monoacetate of resorcin, has been recommended by several dermatologists, and can now be obtained free from its unpleasant odor; it does not discolor white hair, but in other respects he has not found it superior to resorcin itself.

In severe cases an ointment may be required at first and may be rubbed in every night and washed off in the morning, or a small quantity applied once or twice a week after shampooing, *e.g.*:

> Naphthol B, gr. v-x;
> Sulph. præcip., gr. x-xx;
> Resorcin, gr. x-xx;
> Ol. lavand., min. i-ij;
> Vaselini, gr. ad ℥j.

When seborrhea is not a marked feature, as in toxic and nervous cases, pilocarpine may be substituted for the perchloride of mercury in the first prescription or prescribed with ammonia or other stimulant, *e.g.*:

> Pilocarpini nitrat., gr. v;
> Liq. ammon. fort., ℥j;
> Tinct. lavand. co., ℥j;
> Spt. vini rect., f℥jss;
> Aquæ, q. s. ad f℥vj.

This lotion is also effective in slight degree of seborrhea, because the ammonia forms a soap with the fat of the scalp.

Other useful stimulants are chloral hy-

drate, acetic acid, and cantharides; the last should be used with caution on account of its action on the kidneys. Formalin is contained in several of the proprietary remedies, but has proved disappointing in Dore's hands.

Internal medication should not be forgotten, especially in neurotic and anemic cases, and the glycerophosphates, cod-liver oil, iron, strychnine, and arsenic are of service.

The employment of vaccines of the microbacillus of seborrhea at one time held out a hope of a scientific treatment of baldness. and Dore has observed one or two patients in which the seborrhea was checked for a time, and accompanied by renewed growth of hair, but unfortunately the improvement was only temporary. As yet the method is only applicable to certain selected cases, and has not proved sufficiently successful to warrant its systematic use. Massage and the high-frequency current are sometimes of service, but such methods are the happy hunting-grounds of unauthorized persons, and are often persisted in long after they have ceased to do good.

There is no royal road to the cure of baldness, and the multitude of preparations advertised as infallible hair-restorers is an indication of the failure of most of them to accomplish what they profess.

THE MODERN TREATMENT OF HEART DISEASE IN CHILDREN.

Writing in the *Clinical Journal* of November 5, 1913, CAUTLEY says that in all inflammatory cases in which there is the least suspicion of rheumatism salicylates and alkalies must be prescribed. The patient is kept in bed on a light milk and carbohydrate diet, fruit and vegetable soups being allowed as a change. Complete rest and a trained nurse are necessary. Blistering or counter-irritants may be used, but are chiefly efficacious in pericarditis. Vaccines and serums are of problematic value. There is hope that, when the organism of rheumatic fever is isolated, an autogenous vaccine may prove beneficial. Cautley does not wish to ignore the extremely valuable work done in this connection, but, though realizing that many observers are agreed that the genuine organism has been already discovered, there seems to be at present a disinclination to accept it as absolutely proved. In infective endocarditis—fortunately infrequent in children—Cautley's experience with vaccines and serums has proved unsatisfactory. It is difficult to grow the incriminated organism from the blood, difficult to prove that the organism obtained in cultures is the one causing the disease, and difficult to obtain good results from an autogenous vaccine or from a polyvalent serum.

Recourse is sometimes had to paracentesis for the relief of pericardial effusion. It is rarely essential in rheumatic pericarditis, for even the largest effusions may be absorbed. It is a point for discussion whether the operation would promote more rapid recovery. For purulent effusions the pericardium must be opened and drained. Another and more modern operation, sometimes called cardiolysis, is resection of the rib cartilages over the cardiac area, for the relief of general adhesions of the pericardium. The treatment of cardiac failure and backward pressure is the same at all ages. For extreme edema of the lower limbs multiple punctures and sterilized dressings are more satisfactory than the insertion of Southey's tubes. Iron and glycerophosphates are given when compensation is established. Compensation is maintained by regulation of the mode of life, diet, sleep, hygiene, and exercise. These patients must not be allowed to become chronic invalids. A more just appreciation of their capabilities is now general in comparison with the views held by the past generation. If there is merely some mitral regurgitation, the only precautions necessary are against rheumatism and overstrain. Such children ought not to take part in football, races, steeplechases, and like competitions. They may take part in other varieties of exercise, during which they can stop as soon as they feel any cardiac discomfort. If compensation is less complete, more care is needed. The diet

must be regulated, the bowels kept open, and the general health attended to. A weekly dose of blue pill or calomel, and digitalis once a week or more frequently over a long period of time, will often maintain and even increase the degree of compensation.

In every case it is essential to recognize the cause and differentiate the type of cardiac disease, and clearly to understand its probable course and prognosis. Our methods of treatment do not differ markedly from those of the past, but Cautley thinks we may claim that they approximate more accurately to the needs of the particular patient, that we appreciate more clearly the necessity for prolonged rest and great care during convalescence, and that we do not hold such gloomy views as to the prognosis in heart disease.

THE TREATMENT OF HEMOPTYSIS IN PULMONARY TUBERCULOSIS.

BURNS writing in the *Journal of the American Medical Association* of December 20, 1913, gives this method of treatment:

The patient who begins by coughing to expectorate clear blood from the lungs is immediately placed in a reclining position and is admonished to make no exertion. A curved basin is placed at the side of the face so that the patient may expectorate easily without lifting or turning his head. Any tight-fitting garments are released, but it is not well at this time to try to undress the patient.

Nitroglycerin, in 1/100-grain dose, is given subcutaneously as early as possible after the onset of the hemorrhage. Meanwhile an attendant prepares an ice-bag, also cracked ice to be taken by mouth. The ice-bag is placed at the patient's chest, and if pain in any particular locality therein is complained of, the ice-bag is centered at that point. It often occurs that the patient has felt pain and soreness in a definite part of the lungs for some time prior to the hemorrhage, and at this point may be the focus of the bleeding. Hence the advisability of keeping the ice-bag over that spot.

It is well to encourage the patient and to tell him that very few people ever die from hemoptysis, and that by keeping quiet he may escape any serious consequences. A few reassuring words from the physician and nurse will go a long way toward quieting the demoralization and panicky fear which many patients experience on the appearance of coughed-up blood. The patient should be told that he can help matters immensely by refraining from unnecessary coughing, by lying quietly, flat on his back without a pillow, and by keeping as calm as his excited state of mind will permit.

Assuming that the patient is not suffering from extreme asthenia and is not affected with severe gastroenteritis or any ulceration along the digestive tract, a dose of magnesium sulphate from 1 to 2 ounces is administered within fifteen minutes to one-half hour after the appearance of the hemoptysis. Heroic suggestion and encouragement on the part of the physician are often necessary and are at the same time effective in securing the patient's coöperation both to swallow the medicine and to retain it. He has noted few cases in which the patient has lost the dose given, for, realizing his critical situation, he appears anxious to do his utmost to assimilate the salts; these may be more or less disguised by various substances and rendered pleasanter and easier to take.

It might be urged that this treatment is dangerous in that it might have a tendency to encourage nausea and distress, with vomiting and gagging, at a most critical period, and hence occasion the release of more blood from the lungs. This has not been his experience, and, furthermore, he has seen very few cases in which it might be suspected that retching, following the administration of the salts, was attributable to that cause. The beneficial results of this treatment are seen as soon as the purgative action begins. In about eight out of ten so treated hemorrhages have not recurred after the initial attack. No post-hemorrhagic pneumonias ensue such as

often complicate cases in which heavy doses of morphine are given, and the patient feels brighter and more comfortable, in contrast to the depressing after-effects of the morphine. His use of magnesium sulphate depends on two clinical observations as well as other empirical reasons. In the first place, we have noted that many patients having hemorrhage at the time of onset of hemoptysis are suffering from severe constipation. The coincidence of the two conditions is so constant as to warrant the belief that a causative factor is represented, at least in some degree, by the sluggish bowel condition. A popular testimonial as to the genuine value of this tenet is seen in the fact that patients having a tendency toward hemorrhage who have been advised to take exceptionally good care to keep their bowels free are so impressed with the effectiveness of this practice in abating the frequency of the hemorrhages and streaked sputum that they enthusiastically care for this matter themselves.

In the second place, a series of experimental cases was studied with regard to blood-pressure. Whenever it was necessary to relieve a patient's bowels which had not moved for some time, the blood-pressure was taken before relief and after free evacuation of the bowels by magnesium sulphate, when it was found that the blood-pressure dropped anywhere from 5 to 15 mm. (Tycos). The blood-pressure in many cases in which there was persistent constipation was higher than is usual in tuberculous persons.

PITUITARY EXTRACT IN OBSTETRICS.

LINDEMAN, in the *American Journal of Obstetrics* for February, 1914, has this to say on the dosage and indications:

Pituitrin should always be administered by intramuscular injection, and Lindeman's preference for the site of injection is the middle third of the deltoid. He asserts he cannot agree with Edgar's advice, in a recent article, to use 0.04 gm. as an initial dose. He has been in the habit of using only one-quarter of that amount, and with such excellent results that he sees no object in using larger doses, and furthermore these larger doses might cause such violent labor as to do serious damage to the maternal soft spots. He asserts he cannot urge strongly enough that the initial dose be not over 0.1 gm. (1 Cc. of the Parke, Davis & Co., or 0.5 Cc. of the Armour or Burroughs-Wellcome preparation) in all cases in which the patient is already in labor. In those cases in which it is used early in labor with the cervix dilated to less than four fingers, and the membranes ruptured or unruptured, he would use only half this amount; where the cervix is dilated over four fingers and the membranes intact he would use the full dose; but if the membranes are ruptured, again he would use only one-half the dose. The rule of four fingers is arbitrary, but it has proven rather satisfactory in Lindeman's experience for this reason: where the cervix is less than four fingers dilated, the pressure with each pain comes almost directly from above, and the dilatation occurs chiefly by retraction, as there is very little protrusion of the rounded wedge into the cervical orifice. But after the cervix is four fingers dilated, the wedge, either consisting of the bag of waters or the head, is pretty well engaged in the orifice, and dilatation occurs by actual dilatation or divulsion. Now in this case if the hard head does the stretching too forcibly, severe tears are likely to result, and Lindeman consequently advises smaller doses than where we have the soft bag of waters acting as the dilator.

After the cervix is completely dilated full doses can be safely given unless there is marked disproportion, obstruction, or weakening of the uterine muscle. These conditions with too violent a labor might cause a rupture of the uterus, but if no obstruction is present there is nothing to fear.

Where pituitrin is used for the induction of labor, large doses (0.1 to 0.2 gm.) may be given with perfect safety. It would seem that so much of the energy of the drug is used up in starting the labor that the pains induced are never very strong

at the outset, and the effect wears off before stronger pains develop.

Lindeman draws the following conclusions:

1. In pituitrin we have a drug that is of undoubted value in almost all cases of simple inertia and fatigue of the uterine muscle.

2. It is of value occasionally for the induction of labor at or near term.

3. It seems to be practically devoid of harmful effects, and its dangers are few and easily guarded.

THE TREATMENT OF SKIN AFFECTIONS BY SOLID CARBON DIOXIDE.

In the *British Medical Journal* of October 19, 1913, BUNCH says that at the meeting of the British Medical Association last year he read a paper on two thousand nevi which he had treated by the application of solid carbon dioxide, quite aside from other methods of treatment, and he has treated a large number of nevi since. Apart from the rapidity and comparative painlessness of the method, one great advantage is the ability to cut or mold the stick of snow to any shape, so that a nevus of reasonable size, whatever its irregularity of outline, can be accurately frozen in its whole surface at a single application—a result which cannot, of course, be obtained by such methods as electrolysis, the cautery, or radium. A single application is usually sufficient to cure a stellate nevus or small angioma if care is taken to shape the stick of snow accurately to fit, including a margin of healthy skin of one or two millimeters all round, and exercising firm pressure on the skin.

Pigmentary nevi, especially if they are hairy, usually need more than one application, and it is much better to do too little at one sitting than too much, as in Bunch's experience quite unsightly scars—sometimes keloidal—are produced by a too prolonged application of the snow to moles, the scar being often to all intents and purposes as disfiguring as the original skin lesion. When the hairs on the mole are coarse, he prefers to remove them by electrolysis, and the subsequent return of any pigment in the nevus can be obviated by giving radium applications while the skin is healing up from the carbon snow treatment.

In the case of nevo-fibromata and nevo-lipomata, where excision is objected to, a great deal of disfigurement can be removed by treating the purplish skin areas with carbon dioxide until the surface is white, and then inserting some electrolysis needles, insulated with shellac to within half an inch of the point, right into the swelling, and repeating this procedure if necessary at different points of the swelling.

Port-wine stains are undoubtedly the most unsatisfactory kind of nevus to treat by any method, and one sees cases the color of which is so intense and which involves the deeper structures to such an extent that no method at present at our disposal is capable of doing more than diminish the disfigurement without running the danger of unsightly scarring. The most difficult cases to treat are those in which the corium and underlying structures are deeply involved, and which have a nodular, irregular surface with warty projections, and for these there is no really efficient method of treatment. But for a moderate-sized, red, superficial port-wine stain in a child, where the purple tint is absent or but slightly marked, applications of solid carbon dioxide at intervals of a fortnight or three weeks will often give excellent results. In adults, too, Bunch has been quite successful when the port-wine stain was fairly localized and carbon snow was employed in conjunction with a plaque of radium to the areas which showed the darkest tint. When the color had been eliminated, or markedly diminished, from these areas, applications of solid carbon dioxide were commenced, and the final results were quite good. Of course this method of treatment demands some patience both on the part of the dermatologist and the person under treatment; but from the patient's point of view Bunch gathers that the somewhat prolonged treatment is quite worth while.

Cases of linear nevus and nævus verrucosus also do very well when treated with solid carbon dioxide, but for verrucose nævi where there is much thickening and warty growth very firm pressure must be made, and the pressure maintained for about sixty seconds or even more.

In all these cases Bunch considers that the stick or crayon of solid carbon dioxide is far preferable to any other method of applying carbon snow. At one time he tried a method of dipping the stick or crayon into ether before applying it to the nevus, with the idea of obtaining a greater intensity of cold, and so diminishing the length of the application, but it has been clearly shown that the analogy of a mixture of snow and salt does not hold in the case of carbon snow and ether, and no lowering of temperature is obtained by this means. This also applies to the method of dissolving carbon snow in ether, and painting on the mixture with a camel's-hair brush. This latter method is, however, useful in some cases of lupus erythematosus, when a considerable area has to be covered, and diminution of vascularity, rather than any deep action, is of importance, but the painting has to be repeated so frequently that the inconvenience to the patient more than outweighs any slight advantage in the initial saving of time. This method of treatment, the author says, was first initiated in America, and has now been practically given up there.

When a much greater intensity of cold is required than that obtainable with solid carbon dioxide, or a large surface has to be covered in the minimum of time, it is often convenient to use liquid air. The temperature of solid carbon dioxide is only —78.2° C., while that of liquid air is —190° C., so that with the latter reagent the freezing is much more rapid. There is little appreciable difference in the nature of the inflammatory reaction produced by liquid air and solid carbon dioxide, but liquid air has a much more powerful action. In the liquid state air occupies 1/800 part of its ordinary volume; in other words, if liquid air be vaporized it will expand 800 times, and as the more volatile nitrogen evaporates the temperature rises, and the almost colorless liquid assumes a bluish tint—the color of liquid oxygen—which remains until all the liquid has vaporized. Liquid air can be best applied on a swab of absorbent cotton, and its action can be regulated both by the time of application and the amount of pressure employed. It is rarely necessary to apply it for more than ten seconds.

The application to the skin of either liquid air or solid carbon dioxide for a few seconds causes a preliminary freezing of the tissues, followed by a well-marked inflammatory reaction, which, according to its intensity, may result only in thrombosis of the superficial vessels and fibroplastic sclerosis of the epidermal tissues, or any stage between this and complete necrosis.

The action differs from that of the cautery or a caustic in that all the tissue elements frozen are not indiscriminately destroyed, and the resulting scarring is, owing to the gradual transformation of the tissue elements into fine fibrous tissue, much more supple and inconspicuous than when these other methods of treatment are employed. Moreover, the exact amount of inflammatory reaction can be controlled, both as regards extent and depth.

Rodent ulcer is perhaps the skin disease, other than nevi, in which solid carbon dioxide gives the best results. Small rodent ulcers on the face can frequently be cured by a single application of forty seconds with firm pressure, and if care has been taken to go well outside the raised edge of the ulcer, no further application may be necessary and no recurrence take place. But if the spreading edge be not destroyed in its entirety and a small portion of the edge be left, this usually gives rise to a recurrence in a few weeks or months. The recurrence is, however, considerably smaller than the original growth, and one or two more applications will complete the cure.

When the original ulcer is of the size of half a crown, or larger, Bunch usually gives an initial application of forty seconds, followed by a second application of thirty seconds at the end of the week. The ulcer is

then allowed to heal up under boracic acid dressings, which takes about three weeks, and it is then carefully examined to see whether any traces of the edge still require further treatment. If it appears quite cured, Bunch orders the patient to present himself at monthly intervals, in order that any possible recurrences may be treated before they have had time to make any headway. The results thus obtained are, in his opinion, equal, if not superior, to any results got with *x*-rays, ionization, and radium, and, of course, with greater rapidity and less expense.

Lupus erythematosus of the discoid, or nodular, variety reacts very well indeed to the treatment with solid carbon dioxide, and fifteen-second applications are usually sufficient. When the patches are old-standing ones and there is a great deal of thickening somewhat longer exposures are necessary. The small superficial ulcer which results from the freezing heals up in a week or two, and the newly formed tissue is usually sound and supple, with very little appreciable scarring. In the much rarer telangiectatic type of lupus erythematosus the diffuse reddening is quite unsuitable for solid carbon dioxide, and it is in these cases that Bunch has found a mixture of carbon snow and ether, repeatedly painted on with a camel's-hair brush, useful to diminish the vascularity. It is similarly useful in cases of acne rosacea, after all the larger dilated vessels have been destroyed by electrolysis.

Bunch has used this reagent in a number of cases of lupus vulgaris, and although many of the cases can be cured by it, the scarring is rather excessive if no recurrence is to take place. In small patches the isolated nodules can be more satisfactorily destroyed, one by one, by other means, and large patches are better treated by scraping thoroughly and immediately *x*-raying. If, in addition, a successful Thiersch grafting be performed, the scar will be much better than that got with carbon snow in a really severe case. The latter is, however, preferable to *x*-raying without scraping, on account of telangiectases, which repeated *x*-raying is so likely to produce.

Localized patches of chronic psoriasis, chronic eczema, and lichen planus respond extremely well to freezing. The irritation caused by the lesions of the two latter diseases ceases immediately after the snow has been applied, the patches heal up with healthy skin after a single application as a rule, and even the soreness caused for a time by the snow is far preferable to the itching previously experienced. Corns and warts lend themselves very well to cure by freezing, but they are such bad conductors that very firm pressure has to be made and the exposure increased to a minute or more. The period of freezing can, however, be appreciably diminished by first shaving down the wart until it is nearly flush with the skin and then applying the stick of solid carbon snow. Corns on the sole of the foot after adequate freezing are apt to be rather excessively tender, owing to the resistance of the underlying plantar fascia and the pressure which it causes on the inflammatory swelling produced by the freezing, but this can be diminished or prevented by injecting a few drops of novocaine solution. For corns in this position and for no other skin lesion has Bunch found it advisable to employ any local anesthetic before freezing. Both corns and warts must have an application of carbon snow sufficiently long to destroy them entirely, otherwise there is danger of recurrence, and, judging from certain recurrences which Bunch has observed, some dermatologists seem to be afraid of giving an adequate dose. A shorter application suffices for seborrheic warts.

Chronic ulcers of the leg, when the edge is markedly thickened and indurated, may often be made to take on healthy, healing action by being frozen lightly for about twenty seconds. The object here is not, of course, as in rodent ulcer, to destroy a malignant growth, but to induce the formation of healthy granulations in place of the indolent ulcer base, which shows little or no tendency to form fresh, actively growing tissue. The actual edge of the ulcer, if much indurated, should have a longer exposure to carbon snow.

IMMEDIATE AND LATE RESULTS OF THE WHITEHEAD OPERATION FOR HEMORRHOIDS.

STONE (*Annals of Surgery,* November, 1913), on the basis of 400 operations, reports with some authority upon the value of this procedure. He gives a careful résumé of the literature, and thereafter notes that he had no deaths nor anesthetic disturbances. There were four cases of postoperative hemorrhage, some local abscesses along the stitch line, and in two cases there was postoperative fecal impaction. In most cases a lead and opium pill containing 1 grain of opium was given three times a day, for the first three or four days. Moreover, morphine was usually required hypodermically. Many of the cases required the use of the catheter. When discharged from the hospital they exhibited a granulating wound. One hundred and eighty-five patients were written to at periods varying from something less than five years to fifteen or twenty years. In over 72 per cent of cases the results were perfect. The most frequent complaint was disturbance of the sphincter action. This complaint was variously phrased; "weakness of control of the bowel" and "imperfect control" were common expressions, and in many cases the statement was made by the patient that he experienced inconvenience in this respect only when from medication or indiscretion in diet there resulted an attack of diarrhea. There were 37 cases in which the muscular control was more or less impaired, but in only one of these was there actual paralysis of the sphincter. In a case of absolute paralysis there developed hemiplegia five years after operation. In five cases there was a certain degree of stricture. Two of these were examined by the writer personally. One of them did not know that he had a stricture; in him there was found a narrow, wire-like ring of fibrous tissue of wide caliber which easily admitted the index-finger and caused no symptoms.

The Whitehead operation should not be considered a formidable procedure nor one which results "commonly in incontinence and stricture," as is frequently stated. It does not absolutely and forever preclude the return of varicosities, as some of its advocates claim that it does. A definite indication for its employment is the existence of a rosette or complete circle of varicosities. The simple cases presenting one or several isolated hemorrhoids may not require the Whitehead operation for their relief, but the minor procedures are not so thorough and seem less likely to result in a radical cure.

SURGICAL TREATMENT OF ASCITES.

SCHWARZMANN (*Deutsche Zeitschrift für Chirurgie,* Bd. 124, H. 5-6) states that between the years 1906 and 1912 fourteen cases of ascites were treated in Hochenegg's clinic. Two of these were treated by simple omentopexy, four by fixation of the omentum in a preperitoneal pocket, two by fixation of the omentum in a subcutaneous pocket after the method of Narath, four by preperitoneal fixation of the spleen with omentopexy, one by fixation of the left lobe of the liver with omentopexy, and one by omentopexy together with bilateral saphenopexy. Diagnosis was made either at operation or autopsy in all except one case, in which autopsy was refused. In five of the cases the ascites was due to alcoholic cirrhosis of the liver, in two to infectious cirrhosis of the liver, in two to tuberculosis of the peritoneum, in two to interstitial myocarditis, in one to passive congestion of the liver, and in one to tricuspid insufficiency. The advantages of the operation are the reduction of the ascites and in certain cases the permanent removal of the same; the improvement in the general condition of the patient through lessening of the intra-abdominal pressure, rendering the diaphragm more movable and thus improving respiration and relieving the circulation of the blood; improving the function of the liver; and lastly, verifying the diagnosis through *autopsia in vivo.* The last point appears to be of especial value because of

the difficulty in making an accurate clinical diagnosis. For example, in one case in which operation was done under the clinical diagnosis of cirrhosis of the liver the patient died of miliary tuberculosis of the liver, the ascites being due to tubercular peritonitis. In case of cirrhosis of the liver operation must be done early in order to be of value.

CHRONIC (CYSTIC) MASTITIS AND ITS CONVERSION INTO CARCINOMA.

BERTELS (*Deutsche Zeitschrift für Chirurgie,* Bd. 124, H. 1-4) concludes a study of this subject as follows: Chronic cystic mastitis has for its basis a primary hyperplasia of the connective tissue of the mammary gland. The cyst formation is a secondary phenomenon and is often demonstrable only with the microscope; in the male it is at times entirely absent. The cysts originate through a passive distention of the acini and apparently in part the excretory duct; epithelial proliferation does not play any part in the origin of the cyst; the distention is the result of a damming up of the secretion, which is apparently due to obstruction of the acini or their ducts with newly formed connective tissue. The small cell infiltration which is often found in the region of the cysts is the result of the irritation produced by the retained secretion, a cause which is also responsible for the epithelial proliferation, which is changed into a carcinomatous character without any sharp histological demarcation.

TRAUMATIC ERB'S PARALYSIS IN THE ADULT.

TAYLOR and CASAMAJOR (*Annals of Surgery,* November, 1913) after calling attention to the frequency and the disabling nature of Erb's paralysis note that this condition is always caused by the forcible separation of the shoulder and the head and neck. In such forcible separation the strain first comes on the upper roots of the plexus, and as they give way to the next set of roots, and so on until the entire plexus is ruptured.

Before the nerve-roots themselves give way the deep cervical fascia which lies just in front of them tears, the nerve sheaths rupture, and finally the nerves themselves yield. Combined with these torn fibrous and nerve tissues is the blood-clot resulting from the injured vessels. After a time these elements organize into a cicatrix which prevents the passage of nerve impulse and the regeneration of the nerve fibers.

In certain cases the roots may be torn from the cord itself. The major effect is in the upper roots and shades off in those below unless the traumatism has been sufficient to rupture the entire plexus.

The majority of the cases of palsy fall into the muscular groups which correspond with their dependence upon individual nerve-roots for their innervation. Hence these cases fall into the "upper arm type" in which the fifth and sixth roots are involved. The supra- and infraspinati, the deltoid, the biceps, the brachialis anticus, and the supinators are completely paralyzed because some of its innervation comes from the lower roots of the plexus; the pectoralis major only partially so, since some of its innervation comes from the lower roots of the plexus. There is lost the power of abduction and external rotation at the shoulder, flexion at the elbow, and supination of the forearm, so that the unopposed action of the antagonists causes inward rotation of the arm and pronation of the forearm which gives the characteristic attitude to these paralyzed extremities.

When the lower roots are involved there is loss of power to move the wrist and fingers, and the intrinsic muscles of the hand.

If the damage to the roots occurs close to or within the intervertebral foramina, the nerves running to the serratus magnus, the rhomboids, etc., are injured and wing scapula results.

Occasionally the roots are torn from the

cord itself. The resultant superficial scar formation on the surface of the cord may later cause changes in the reflexes or the appearance of the Babinski phenomenon in the corresponding lower extremity.

The muscles which are totally paralyzed become flaccid, show the complete reaction of degeneration in from five to seven days, and soon begin to atrophy. The shoulder-joint usually becomes a typical flail-joint.

Sensory disturbances are less definite and less extensive. Usually the deltoid region shows the most definite changes. The sense of deep touch is less apt to be affected. Light touch begins to return before that of pain and temperature. In all these cases for many months palpation in the region of the sixth cervical transverse process will demonstrate a tender indurated mass, which is the cicatrix resulting from the torn deep fascia, nerves, and blood-vessels.

When the two lower roots are damaged there is associated injury of the cervical sympathetic. When there has been less than complete rupture improvement always appeared after a time, usually three months, as the lower roots are naturally least injured and therefore show regenerative power first. For this reason the improvement always begins below and progresses upward toward the shoulder. The deltoid and spinati are the last to show results.

Sensory disturbances improve much earlier than do the motor symptoms and may entirely disappear while the extremity is still useless.

The response to the faradic current reappears before much change in the galvanic polarity is noticeable and before voluntary motion is perceptible.

A slowly progressive improvement may cover a period of two years.

Prognosis without operation is distinctly bad, but is greatly improved by proper surgical intervention. The longer the time elapsed between the injury and its surgical repair the less perfect will be the regeneration; the more extensive the lesion the less favorable the prognosis. When the cicatrix extends into the intervertebral foramina it may be necessary to anastomose the distal trunks into other roots.

This procedure gives the only resort when the roots are torn from the cord. Accurate approximation at the time of suture, immobilization of the shoulder and neck in close proximity, and systematic persistent after-treatment very greatly favor the final success in these cases.

If the tissues at the base of the neck are much contused a delay for a few days in order to increase the local resistance is desirable. Where the paralysis is very slight conservatism might counsel delay in the hope of obtaining spontaneous recovery, but in all cases in which the paralysis is at all marked, the time used waiting for spontaneous recovery is wasted.

The plexus may be exposed by either of two incisions: The one starts just above the insertion of the sternomastoid muscle and passes outward and slightly upward across the base of the neck, following the natural wrinkles of the skin. The skin and underlying fat pad are divided in the same line. Usually the external jugular vein, the transversalis coli, and suprascapular vessels are tied and divided. With proper retraction the nerves are well exposed. In wide-spread damage of the plexus it does not give complete exposure. This is gained by a cut which starts at the level of the sixth cervical vertebra and runs obliquely downward and outward to the junction of the outer and middle thirds of the clavicle and divides practically the same structures.

After retraction of the wound in either incision, the deep layer of cervical fascia normally lying just in front of the plexus is found thickened and adherent to the underlying nerves. This is dissected away, thus exposing the roots and plexus, which are examined by sight, touch, and, if necessary, by a tiny electrode to detect the presence of cicatrices which prevent nerve regeneration and the passage of nerve impulses.

When the nerves have been properly pre-

pared, end-to-end suture should follow. The best suture material in adults is fine, strong silk because it is dependable. On opposite sides of the nerve, about one-half centimeter from its freshened end, are passed two sutures transverse to the long axis of the nerve, and including mostly nerve sheath. Each suture is tied so as to get a firm hold and the ends are left long. The other freshened nerve end is treated in similar fashion, and the two are approximated by tying the lateral sutures of the one to the other. One or two fine catgut sutures at the periphery will complete the apposition.

While the nerve sutures are being tied the neck and shoulder are approximated. The fat pad is allowed to fall into place, and the skin wound is sutured with silk. No drainage is used.

The approximation of the neck and shoulder is maintained by means of a steel brace especially designed for these cases and fitted previous to operation, so that it can be slipped on just after the nerve sutures have been tied and thus prevent any chance of tearing them out.

This brace is worn continuously, without a moment's intermission, for six to twelve weeks, according to the individual case.

In those cases in which the cicatrix extends up into the intervertebral foramina, a modified procedure is necessary. The cicatrized root may be split longitudinally up into the foramen, and if good nerve bundles are exposed above, the distal end of the nerve may be sutured into the cleft with the hope that good union will occur. If the split cicatrix does not reveal good bundles above, the only thing left to do is lateral anastomosis of the distal nerve trunk into a neighboring sound root.

In those cases in which the roots have been torn from the cord, lateral anastomosis is the only thing to be done.

Where considerable lengths of nerve-roots must be resected to get beyond the cicatrices and the ends cannot be closely approximated, resort must be had to nerve bridging.

Where the entire plexus is badly torn, and the freshened nerve ends cannot be brought together, a subperiosteal resection of the middle third of the clavicle will permit very greatly increased approximation of the nerve ends.

When the proper time for the removal of the brace has arrived, the extremity may be placed in an ordinary triangular sling supported by the sound shoulder, and so adjusted as to elevate the paralyzed shoulder.

When the change from brace to sling has been made the extremity may be given massage, passive motion, electricity, being taken from the sling every day for that purpose.

At any time after three months from operation voluntary motion may begin to appear in the paralyzed muscles.

ARTERIOVENOUS ANASTOMOSIS FOR IMPENDING GANGRENE.

GOODMAN (*Lancet,* Oct. 11, 1913) reports 15 consecutive cases of arteriovenous anastomosis, the largest number yet reported from a single source. It is recalled that Frank in 1881 was the first to attempt such a procedure. In 1902 Carrel reported his perfected technique. The first operation report was in 1902. It proved unsuccessful. In 1912 Bernheim, of Johns Hopkins Hospital, reported six operations with four successes, and in his review of literature reports 52 performed by 32 operators; of these, only 15 were successful. End-to-end suture according to the method of Carrel was employed 23 times with eight successes; lateral 12 times with four successes; invagination, end of artery into end of vein, twice with one success; intubation according to the method of Wieting, nine times with two successes. Bernheim ascribes the large number of failures, first, to the great number of operators; secondly, to the fact that a number of the cases were seen late in the course of the disease; and thirdly, that vascular surgery is still in its infancy and offers many technical difficulties.

It has been shown by physiological experiment that the establishment of the reversal of the circulation in the extremity is practically impossible. These findings, however, are controverted by 15 successful cases. The indications for arteriovenous anastomosis reside in angiosclerosis and in arterial thrombus, where the integrity of the limb may be preserved by this means until collateral circulation is established. In regard to methods, end-to-end anastomosis offers the simplest technique and is least likely to be followed by thrombosis.

As to results, it has been noted that the foot previously cold and cadaverous in appearance took on a feeling of warmth and a healthy pink color. The pain due to ischemia was relieved shortly after operation in all cases. The vein is pulsating below the site of anastomosis and the part threatened with gangrene, or actually affected by it, turns to normal. Of the 15 cases there were six successes. Several of the cases which promised success required amputation later, but even these had temporary relief from pain. Operation is not advised in the presence of sepsis or advanced or fulminating gangrene. The time for operation is in the pregangrenous stage. In non-septic gangrene the improved nutrition of the leg may be hoped for, permitting lower amputation than would otherwise be possible.

Before the sheath of the vessel is opened the wound must be absolutely freed from and dried of any visible signs of blood, and then covered with sterile wound protectors. Thin, black, oriental silk is best suited to this purpose.

There were 13 end-to-end anastomoses, 1 side-to-side, and in 2 of the cases an exposure of the vessel showed that an attempt to anastomose was not warranted on account of the advanced stage of thrombosis of the vessels. The author believes that the predisposing factors in the symptom-complex of the disease and the results so far obtained by operation warrant us in believing that whenever the operation is undertaken before gangrene has actually set in, the distressing symptoms can be relieved without the sacrifice of the limb to amputation, which heretofore has afforded the only means of relief.

OPERATIVE TREATMENT OF EMPYEMA.

HIRANO (*Deutsche Zeitschrift für Chirurgie,* Bd. 124, H. 5-6) reports upon 118 cases of empyema operated upon in the Hazu Hospital in Japan from July, 1900, to June, 1911. Of these, 93 cases occurred in children under fifteen years of age. In 71 of the cases the affection was on the right side and in 47 on the left side. In two of the cases the disease started on one side, and in about two weeks also appeared on the other side. In the greater number of cases the disease was primary. In the secondary cases it resulted in adults chiefly from serous pleurisy, and in children from croupous pneumonia. Other causes which figured in adults were rheumatism, caries of the ribs, and pneumonia, and in children measles, whooping-cough, and pleurisy. These cases were all treated by rib resection. The results in the adults were very unfavorable. Twelve out of 24 cases died. Only eight cases remained permanently cured. In children 72 per cent of the cases were entirely cured. In the remaining cases the after-results could not be learned.

The details of the method of treatment are as follows: Whenever a patient was suspected of having empyema a small incision was made in the skin over the suspected area and a needle introduced. In all cases this was sufficient to establish a diagnosis, and it was never necessary to do an exploratory thoracotomy. The skin incision was made in the posterior axillary or the scapular line somewhere between the fifth and the tenth rib. In two cases the operation was done on the anterior breast wall because the empyema was localized there. In children the operation field was kept as small as possible and only so much rib resected as was necessary to permit the introduction of a rubber tube the size of the

thumb. In no case was tamponade resorted to, for it either hinders or makes difficult the outflow of pus. Any tendency to hemorrhage could be controlled by gauze wrapped around the drainage tube. The rubber tube is secured by means of a pin stuck through the skin, also by thread carried through the tube from end to end, the ends of this thread being fastened to the skin by means of plaster. The dressing is finished by means of a gauze dressing, which is changed every day down to a thin layer next to the skin, which is changed about once a week. If the pleural cavity does not after a reasonable time become smaller, or if the secretion remains copious, Bier's suction apparatus is brought into use.

EXPERIMENTS ON INTRADURAL ANASTOMOSIS OF NERVES FOR THE CURE OF PARALYSIS.

CADWALADER and SWEET (*Medical Record*, Nov. 1, 1913) state that anastomosis of peripheral nerves for the cure of paralysis has been successful in certain cases of facial paralysis, but when applied to nerves of the extremities the results have not been very encouraging. In 1908 Kilvington conceived the idea of crossing ten intraspinal motor roots of the spinal cord for the relief of paralysis of the bladder which results from injury of the lumbosacral spine. He operated upon a series of dogs, and was encouraged to operate upon a man. His experimental reports do not contain the records of post-mortem examination, unfortunately. The authors determined therefore to study a series of cases both clinically and microscopically. Clinically their dogs presented no evidence of restored function. Microscopically the sections at the site of anastomosis showed extensive scar formation, which dense tissue evidently may have microscopically interfered with the reunion and regeneration.

The authors have therefore undertaken to exclude this perineural connective tissue by enclosing the ends of the nerves in a delicate celloidin tube. The results thus far obtained are very promising and will be reported later. The authors wish to assume a very conservative position, in view of the amount of function which can often be seen in these incontinence cases with no operative treatment.

REVIEW OF THE CASES OF APPENDICITIS DURING THE LAST THREE YEARS IN THE SURGICAL CLINIC, HALLE.

ZANDER (*Archiv für Klinische Chirurgie*, Bd. 102, H. 4) reports that during the last three years 308 cases of acute appendicitis have been treated in the clinic of Bramann of Halle. Of these 173 were in males and 135 were in females. The total mortality was 9.7 per cent. This high mortality was due in the majority of cases to late operation. Out of the total number 66.5 per cent were admitted to the hospital after the second day of the disease. Of these 19.6 per cent already had generalized peritonitis. An improvement in results is to be expected only through the more frequent use of early operation. Acute appendicitis is easily diagnosed at its inception; the most certain diagnostic sign of a serious disease is rigidity of the abdominal wall. The exact diagnosis of the condition does not justify drawing a conclusion as to the prognosis. Therefore, early operation is at the present time considered to be the best means of accomplishing a quick and certain cure and avoiding all complications.

One should operate in the early stage of the disease as soon as the symptoms make it apparent that a serious disease exists. If the case is a mild one, there may be delay for twenty-four hours. If, during this time, all symptoms clearly subside, one may treat the case expectantly. But if, during the first twenty-four hours, the symptoms increase in severity one should proceed at once to operation. If the patient has a history of one or more previous attacks, operation should be done even if the present attack is a light one. In the late stages of the disease operation is recommended in all cases

in which the disease is confined to the appendix; in all cases with peritonitis; in all cases of large abscess; and in the interval in all severe cases. The danger of appendicitis is greater the longer it has existed and the more wide-spread it has become. One should operate early, carefully, and quickly in peritonitis, the object of the operation being to remove the focus of infection. In operating the strength of the patient and the condition of his circulation must be considered. In late cases operation should be confined to removal of the appendix, further results being dependent upon general treatment. The decision as to an interval operation should depend upon the individual and social indications. In case such factors do not figure in the choice early operation should be done in the second attack.

PANTOPON-SCOPOLAMINE NARCOSIS.

BURGI (*Deutsche Zeitschrift für Chirurgie,* Bd. 125, H. 3-4) after reviewing the literature and considering his own experience with pantopon-scopolamine anesthesia, concludes that of all combinations of scopolamine with alkaloids of the opium series the best influence is exerted by the combination of pantopon with scopolamine. This combination is as well adapted as morphine and scopolamine to the production of a mild narcosis in which small operations can be done, and after which complete anesthesia can be produced if desired by means of inhalation or injections into the spinal canal. It has the advantage over the morphine-scopolamine combination chiefly in that it has less influence upon the respiratory center. In addition to this, either when used alone or in conjunction with inhalation narcosis, it is much less apt to produce vomiting. A dose of 0.04 gramme of pantopon with 0.0004 to 0.0006 gramme of scopolamine is without danger for a strong individual of middle age. In especially delicate or old or sick persons who suffer from respiratory disturbances the dose must be considerably less. The body weight of children as well as the peculiar sensitiveness of infants must be fully considered in arriving at the proper dosage. Labor pains are usually controlled by the use of 2 cgms. of pantopon and 2 decimilligrammes of scopolamine. This dose is harmless for both mother and child.

BRAIN SURGERY.

STIEDA (*Archiv für Klinische Chirurgie,* Bd. 102, Heft 4, 1913) concludes from the experiences and results of a fairly comprehensive material in von Bramann's clinic in Halle that brain tumors should usually be dealt with by a two-stage operation. Complete anesthesia is unnecessary, as it is sufficient to spray the operative field with the one-half per cent of novocaine-suprarenin solution. If this method of anesthesia is used, special hemostasia by other means is usually not necessary. After removal of the larger brain tumors tamponade and drainage are unnecessary and primary suture may always be resorted to. The implantation of other tissues, for example fat, may be dispensed with. In order to close defects of the dura after removal of the brain masses, transplantation of fascia from the thigh is the best method.

THE SUN'S RAYS IN THE TREATMENT OF TUBERCULOSIS OF THE FOOT.

LEUBA (*Deutsche Zeitschrift für Chirurgie,* Bd. 125, H. 5-6) reports on the treatment of tuberculosis of the foot from the Rollier Institute in Leysin. The general technique of the treatment is as follows: Upon the arrival of the patient, if the disease has not yet localized itself, the patient is kept in bed until he becomes acclimatized. After a period varying from three to fifteen days, during which the bed of the patient is placed upon the terrace throughout the forenoon, the treatment by means of the sun's rays is begun. No physiological method of treatment requires such rigid individualization as heliotherapy; the patient must be enabled to expose the entire un-

clothed body to the sun's rays. In order to accomplish this object great care must be exercised in order to avoid erythema, bullous dermatitis, and disturbances of the nerves and heart. The experience of Rollier in the last ten years shows that by the proper dosage these conditions can be entirely avoided. On the first day the foot alone is exposed to the sun three to five minutes at intervals of fifteen to twenty minutes; on the second day three to ten minutes for the foot and three to five minutes for the leg; on the third day three to fifteen minutes for the foot, three to ten minutes for the leg, and three to five minutes for the thigh. In this manner there is daily exposed a new part to the sun's rays. After a varying number of sittings the skin becomes more or less pigmented, and the patient can endure the sun's rays for four hours or even longer without harm. The region of the heart is protected by small moist compresses, and at first the head is protected by a white linen covering or by means of an umbrella fastened to the bed, until, after a while, this precaution is unnecessary.

By this means since 1903, 94 cases of tuberculosis of the foot have been treated by means of the sun's rays. Of these 94, 42 were suffering from fistulæ and were brought to Leysin as the last resort after amputation had been refused. The most of the remainder were suffering from other forms of tuberculosis and came to the Institute in a serious condition. The youngest patient was two and a half years old and the oldest sixty-seven years. The localization of the disease was in 54 cases in the tibiotarsal joint, in 11 the calcaneus, in 19 the tarsometatarsal joint, and in 10 the tarsal joint. Investigation in December, 1912, showed that of the 35 cases without abscess 33 were cured and two improved; of 17 cases with abscess 15 were cured, one stationary, and one death; of 42 cases with fistulæ 39 were cured, two improved, and one stationary. In two of the stationary and one of the improved cases amputation had to be carried out after a more or less lengthy trial of heliotherapy. One of the cured cases returned with a recurrence four years later. In three of the improved cases it was not possible for various reasons for them to remain in Leysin for a complete cure. In five cases in which cure of the foot tuberculosis was obtained the heliotherapy is being continued either on account of localization of the disease in another joint or because of pulmonary tuberculosis; 82 cases have been cured for varying periods and have returned to their former occupations.

Of all the conservative methods of treatment, heliotherapy produces results in the shortest time. Many cases suffering from the disease from two to eight years and treated by means of injections of iodoform and tuberculin, partial resection, curettement, etc., and who entered the Institute in a quite hopeless condition, were cured within a year by heliotherapy.

DIAGNOSIS AND TREATMENT OF GUNSHOT WOUNDS OF THE SPLEEN.

MICHELSON (*Deutsche Zeitschrift für Chirurgie,* Bd. 124, H. 1-4) notes that although about 80 cases of gunshot wound of the spleen have been reported, this subject has as yet been relatively little elaborated, because in no case has any one surgeon had an opportunity to study more than a few cases. The author reports 10 cases from the clinic of von Bergmann in Riga. The diagnosis of penetrating wound of the spleen offers the most difficult problem in the surgery of this organ, and it is frequently impossible to arrive at a definite conclusion. It is not safe to rely upon the position and direction of the wound, as is shown by one case in which the wound of entrance was in the fourth intercostal space, yet the spleen had been penetrated.

Another difficulty offered by wounds of the spleen is that frequently there is very little early bleeding. Also frequently the symptoms of injuries to neighboring organs come into the foreground to such an extent that in some cases wounds of the

spleen have been overlooked even at operation.

Isolated wounds of the spleen as the result of gunshot have been reported in only seven cases, one of which was a case of the author's. In the great majority of patients there are, in addition to the injuries of the spleen, wounds of the stomach or small intestine; fortunately, as a rule, paradoxical though it may seem, welcomed by the surgeons because they removed all doubt as to the necessity of an immediate operation, which is in this way carried out before the strength of the patient has been lost through the loss of blood, which is apt to come on late. The most constant physical sign of injury to the spleen is rigidity of the abdomen, which appeared in all of the author's cases, except one, which was moribund. The symptoms of internal hemorrhage, such as paleness, heart weakness, dulness in the abdomen, pain in the shoulder, etc., were rather inconstant.

Although as stated by Perthes as much as one liter of blood may be poured out amongst the intestinal coils without being physically demonstrable, sooner or later in most cases there will occur dulness on percussion over the abdomen as the result of the accumulation of blood, even in the case of small wounds. Nevertheless in the experience of the author time has not been allowed to elapse before operation for such a phenomenon to develop. Likewise the author's cases have not afforded a means of demonstrating the sign described by Balance, which consists of dulness under the border of the left ribs with the patient lying on the right side.

In the author's experience, which covers a considerable number of abdominal wounds, a slowly developing rigidity of the upper abdomen is very characteristic of the accumulation of fluid along the posterior abdominal wall or behind the peritoneum, such as occurs in injuries of the duodenum, the spleen, the pancreas, and the bile passages. It should always be considered an alarming sign, although not an obvious one. The appearance of this physical sign should lead to immediate laparotomy. The incision should be made so as to permit of exposure of the spleen and at the same time allow an examination of all the abdominal organs. As to dealing with the spleen it is certain that splenectomy offers the quickest and most certain method of controlling severe bleeding. This operation seems preferable in all cases in which the spleen or the vessels of its hilus have been much injured. Care must be exercised so that wounding of the pancreas may be avoided on account of the danger of fat necrosis.

So far as suture of the spleen is concerned it does not seem adapted to the cases as a rule. Likewise tamponade does not seem worthy of recommendation because of the danger of the formation of adhesions and of trouble later on with the scar which is produced. An examination of statistics involved in the cases reported to date shows that splenectomy gives the most favorable result. In the author's own experience the mortality in operated cases was only 33 1/3 per cent, while all cases which were not operated upon proved fatal. In all cases in which gunshot wound of the spleen is suspected operation should be done without waiting for marked symptoms of internal hemorrhage. A gradually oncoming rigidity of the left rectus must be regarded as a strict indication for immediate laparotomy. A method of choice in severe hemorrhage is splenectomy, although in lacerated wounds suture with the line of suture overlaid by omentum may be resorted to. Tamponade should be avoided wherever possible.

OPERATIVE TREATMENT OF PROSTATIC HYPERTROPHY.

Von Engelmann (*Deutsche Zeitschrift für Chirurgie,* Bd. 124, H. 1-4) says that in hypertrophy of the prostate operation should be advised as soon as there is any considerable amount of residual urine, or when complete retention requires the constant use of the catheter. When it is found either by palpation or by means of the cystoscope that the prostate has reached a con-

siderable size, or when the middle lobe protrudes much into the bladder, prostatectomy is the operation of choice. When there is relatively little hypertrophy or when the hypertrophy of the middle lobe extends into the bladder in such a way as to interfere with urination, the Bottini operation is to be recommended. In the severe degrees of hypertrophy, the general condition of the patient is the only contraindication against prostatectomy. In severe infections of the urinary tract, especially in pyelonephritis, prostatectomy is to be recommended because by this means better drainage is established. In case of serious impairment of the kidney function radical operation is usually contraindicated and resort must be had to palliative measures such a cystotomy and vasectomy.

THE TREATMENT OF CORNS AND WARTS BY IONIZATION.

JONES (*British Medical Journal,* Oct. 11, 1913) thus treats corns and warts. There is first used a zinc positive needle for the centers or foci of the corn, and this is followed by ionization of the whole affected area with a zinc plate and a pad moistened in the usual way with a zine salt. It is usual to prescribe a compress of zinc sulphate of a strength of one per cent to be applied for some hours before the ionization, in order to have the horny epidermis imbibed with the solution beforehand, so far as this can be accomplished by simple diffusion.

After such treatment corns on the soles of the feet disappeared in three or four weeks, leaving no trace. As to warts, transfixion with a zinc needle with a milliampere of current for a minute suffices. If large the wart is transfixed crucially. A little more current or a longer time may sometimes be desirable.

When warts are numerous and small and close together, ionization with a pad and zinc solution is quicker than needling of the individuals. For some warts magnesium answers very well, especially for the flat multiple warts of the backs of the hands and of the face. There seems to be some evidence that the magnesium salts by the mouth exercise a specific influence upon warts, causing them to crumble away and disappear in a very few days.

EXCLUSION OF THE COLON.

VON BECK (*Beitr. z. klin. Chir.,* 1913, lxxxiv, 338) reports his results in fifty-two cases of colon exclusion by means of ileosigmoidostomy performed for chronic ulcerous colitis (26), chronic pericolitis and displacement (6), extensive tuberculosis of the bowel (10), and for inoperable colon carcinoma (10). Three cases died during the first four weeks after the operation (peritonitis, pneumonia, thrombosis); in the remaining forty-nine cases a good functional anastomosis resulted, no bad effects following the short-circuiting. The length of life of the carcinomatous patients after operation was four to twelve months.

Excellent end results were obtained in the tuberculous cases, even in extensive involvement of the lower ileum, cecum, and colon. These cases were operated in two stages: in the first the diseased area was extirpated, the ascending colon tied off, and the ileum was anchored anteriorly to the abdominal wall; after four to six weeks the ileum was sutured to the sigmoid and the tuberculous ascending and transverse colons were then excluded. Results: One death, three years after operation, from tuberculous infection of the bowel, the colon, however, being normal; two deaths, six and eight years respectively, after operation of pulmonary phthisis, colon entirely normal. Of the remaining seven cases, six are well and able to perform their daily duties (four to ten years after operation). Of the thirty-two cases operated for colitis, pericolitis, and displacement, six cases returned in from one to five years complaining of gradually increasing obstipation, relative obstruction or retrograde peristalsis. All were women. In three of the cases an appendicostomy had been performed and irrigation treatment

employed ineffectively. In three cases a secondary operation was necessary on account of retrograde peristalsis, saccular dilatation of the rectum, fecal accumulation to the middle of the transverse colon, and spasms in the ileum and jejunum. In these cases the author recommends the exclusion of the colon by means of ileosigmoidostomy with invagination of the distal end of the ileum into the cecum. In cases of spasm and retrograde peristalsis—peculiar to the female sex—he advises making an end-to-end anastomsis between the ileum and sigmoid and anchoring the upper end of the sigmoid outside as a mucous fistula or extirpating the colon at a later date.

OPERATIONS FOR HARELIP IN THE OUT-PATIENT DEPARTMENT.

Under this title NICOLL (*Edinburgh Medical Journal,* November, 1913) comments upon the extremely low mortality, even in alveolar cases and those complicated by cleft palate, in both of which the intermaxillary bone has to be cut and wired in position as a preliminary to the harelip operation proper. The healing is by first intention and the cosmetic result unusually good. The subsequent contraction of the scar tissue is a serious factor in harelip operations. Inevitable in all, it leads in a number of cases to flat nostril, notched lip, or asymmetrical mouth, since it is not possible to keep out-patients under constant observation. The effects of scar contraction are most troublesome in unilateral cases. In the avoiding of flat nostril, notched lip, and asymmetrical mouth in unilateral harelip, experience has led Nicoll to adopt five lines of procedure which are more or less opposed to much of the current teaching on the subject. They may be briefly stated as follows:

In the preliminary cutting and wiring of the intermaxillary, that process is so pared, manipulated, and wired that the tip of the nose and the nasal septum are distinctly displaced to the deformed side—that is to say, the flattening of the nostril is partly remedied by pulling the nasal tip to the ala instead of being entirely remedied by lifting the ala toward the tip and septum of the nose. The latter procedure demands extensive under-freeing of ala and cheek, with inevitable subsequent contraction of the raw surface created and resulting flattening out of the nostril.

The majority of current writers lay stress on the avoidance of tension by free elevation of ala, lip, and cheek by undercutting. A not inconsiderable experience has driven him into the opposite camp of the small minority who hold that a moderate degree of tension is the lesser evil. Sutures properly placed and tied will stand a good deal of tension without giving or cutting; and a lip which looks in the first instance taut and strained will ease off wonderfully in a few weeks. On the other hand, the extensive undercutting necessary to obtain an ideal degree of primary relaxation produces necessarily much scar contraction, with resulting secondary distortion.

In cases in which extensive elevation of ala and lip are unfortunately necessary, secondary contraction with adhesion to the underlying bone may be avoided by the insertion of tinfoil between the soft parts and the periosteum. Mucous membrane or mucous epithelium soon lines the raw tissues opposed to the surfaces of the plate, so that these do not adhere when the plate is withdrawn, but form a part of the buccal cavity.

Secondary cicatricial contraction tends to produce a notch in the prolabium. Placed laterally, this is often very unsightly. In the middle line it is always much less so, and in some cases is even "rather becoming." Only those methods of paring the flaps which provide for median juncture should be adopted.

A specially made oval tube or an ordinary vulcanite, celluloid, or metal oval nasal splint for deflected septum, such as Asch's, Meyer's, or Kyle's, has a really remarkable effect in molding the deformed nostril and preventing secondary flattening. It may be introduced at the time of the operation, or during the operation the closure of the nostril may be purposely overdone and the

splint introduced at the end of two or three weeks. In either case the shape and size of splint are judged by those of the normal nostril. Its position is settled by making its long diameter, if oval, correspond to the line of that of the normal nostril. This will necessarily be at right angles to the long diameter of the aperture of the flat malformed nostril. The expense of having these splints specially made of small size for harelip cases may be avoided by using nasal splints of the usual stock sizes and cutting them across with a fine file at the point of suitable circumference.

THE VALUE AND LIMITATIONS OF DIASTASE, UREA, AND PHTHALEIN IN ESTIMATING RENAL FUNCTION IN ASSOCIATION WITH URETERAL CATHETERIZATION.

GERAGHTY and ROWNTREE (*Annals of Surgery*, December, 1913) in a further contribution call attention to the fact that Wohlgemuth has introduced quantitative diastase estimation of the urine as a method of determining the relative functional capacity of the two kidneys. In a series of normal cases he found the diastatic activity the same, or practically the same, on each side, while in unilateral disease the diastase content of the urine from the pathological kidney was always lower than that from the normal kidney. Simultaneous determination of function by means of cryoscopy, phloridzin, and indigo-carmine showed that a certain amount of parallelism existed between the findings of these various tests and the amount of diastase present. He suggests that the diastatic activity may be of value in determining the advisability of nephrectomy in certain instances.

In a series of forty cases the study of the phthalein output, of the urea per cent, total urea, and diastase from each kidney is presented, an effort being made to determine the relative reliability and practicability of these tests as well as to ascertain what advantages, disadvantages, and limitations pertain to each.

The diastase has been determined according to the original technique of Wohlgemuth, which is as follows: After neutralization, the same amount of urine from each side is placed by means of an accurately graduated pipette in a series of twelve test-tubes in amounts decreasing from 0.6 Cc., 0.5-0.1-0.04 Cc. A sufficient quantity of one-per-cent NaCl solution is then added to bring the amount of fluid in each tube up to 1 Cc. To each tube is added 2 Cc. of a 1:1000 solution of freshly prepared soluble starch. The tubes are immersed in a water-bath at 38° C. for thirty minutes, after which they are placed in cold water for three minutes. To each tube is added sufficient 1/50 N. iodine solution to elicit a permanent color, violet or blue occurring where digestion is not complete. The tube in each series immediately preceding incomplete digestion of the starch indicates the diastase content of that particular urine, and from this the *d* is calculated; *d* is the diastatic activity expressed as the number of Cc. of 1/10-per-cent starch solution capable of being digested by 1 Cc. of the urine utilized.

It might be emphasized that neutralization of the urine is important. In one case in which the urine on the left side was extremely alkaline, determined on the unneutralized sample, *d* was 4, whereas after neutralization it was 20. Although an extreme case, this indicates the necessity of neutralization in every instance.

Urea was determined in all of the earlier work by means of the Doremus method. In some of the later cases, however, Marshall's new method was utilized.

The phthalein test was utilized according to the technique described in previous communications, except that the drug was given always intravenously.

In forty cases fifty diastase determinations were made. The general result coincides fairly well with those of Wohlgemuth in that in the majority of instances the diseased or more diseased kidney is correctly indicated through the decreased diastatic activity of the urine from that kidney. Where the various tests harmonize no comment is necessary.

Six cases serve to demonstrate that dias-

tase is not an infallible index of relative functional capacity, since in two apparently normal cases considerable differences existed between the two sides, in two cases a definite lesion was not indicated, in another the functional injury was exaggerated, while in the sixth case unless the quantity of urine was taken into consideration an erroneous impression of function was given.

The diastase is of very considerable value, however, in the majority of cases. It is about equal in value to urea per cent. In some cases it may be of even greater value than urea per cent, because of the fact that it is not so readily affected by dilution. In the cases of free urinary secretion, which are usually cases without ureteral inhibition, the phthalein gives much more accurate information, and in such cases diastase and urea are of minor value only.

The employment of functional tests in association with ureteral catheterization is attended with two great difficulties which in certain cases make it impossible to obtain all desirable information from any one test: (1) Inhibition of function, and (2) leakage around the ureteral catheter.

Any discrepancy due to inhibition can be detected readily through the determination without ureteral catheterization of total renal function by phthalein, and error can thereby be avoided. For instance, with a total phthalein excretion normal or nearly normal, one kidney at least is normal or practically so. If, in such a case, on ureteral catheterization one should find on one side decreased function, which under ordinary conditions would be an indication for nephrectomy even though the function of the supposedly healthy kidney as estimated with the aid of the catheter showed an apparently dangerously low excretion on account of the inhibition, one need not hesitate about removing the diseased kidney. The low function here is clearly the result of inhibition, the extent of which is indicated by the discrepancy between the separated functions and the total function without ureteral catheterization.

In cases of bilateral tuberculosis, the amount of pus from each side being practically the same, the phthalein can demonstrate that one kidney has a function far in excess of the other—a function sufficiently good to allow of successful nephrectomy. However, in certain instances inhibition might be so marked and the elimination of phthalein from each side consequently so small that it might be impossible from phthalein alone to determine which is the better kidney. Here diastase and urea per cent, together with a difference in the intensity of urine pigment and a consideration of the total phthalein, would be of value. No such instance, however, has yet been encountered. In the majority of cases the influence of inhibition can be minimized through longer collections (one-half to one hour).

Occasionally owing to extreme nervousness on the part of the patient or on account of unusual pain attending the presence of the catheter in the ureter, the time of catheterization must be curtailed to such an extent that an accurate quantitative determination of function is impossible. Here one is obliged to secure all of the necessary information from microscopical and clinical data and from urea per cent, time of appearance of phthalein and possibly of diastase, provided sufficient urine has been excreted to allow the application of the tests.

In order to obtain an accurate quantitative estimation of the function of each side it is necessary to secure complete collection of the urine. By the use of Albarran's flute-end catheter this is usually possible. In a certain proportion of cases, especially those with relaxed ureters, leakage does occur and sometimes in amounts sufficient to nullify the findings. Unless one repeats the catheterization, which is not always practicable, using the Garceau catheter on one side along with transvesical collection for the other, knowledge of the relative functional values must be largely obtained from urea per cent, diastase, and time of appearance of phthalein. This was well illustrated in a case with normal kidneys in which so much leakage occurred that the estimation

of the relative function from phthalein was impossible, but the diastase, urea per cent, and phthalein appearance time all indicated identical functional capacity on the two sides.

The number of tests has increased to such an extent that the use of all of them is impracticable. It becomes necessary, therefore, to consider what tests are really necessary for all of the available information under all conditions. In order to make a judicious selection it is necessary that one be familiar with the peculiarities, advantages, disadvantages, and limitations of each and all of the approved tests.

The method of procedure which has furnished the greatest amount of information is as follows: In all cases demanding ureteral catheterization the total functional capacity is first determined by phthalein without ureteral catheterization. Where the total function is low a cryoscopy of the blood serum or a blood urea determination is made (Marshall's method). After ureteral catheters are in place and a flow of urine has become established, the phthalein is given intravenously and the time of appearance on the two sides noted. Urine is then collected for periods of from fifteen minutes to one hour, starting from the first appearance of the drug, the length of the period depending upon the character of the information desired. Where leakage or inhibition of a grade sufficient to interfere with quantitative determination does not occur, the quantity of phthalein from each side during a period of fifteen minutes, or preferably one-half hour, is considered the index of the function of the individual kidney.

Total estimations almost invariably corroborate the findings of the phthalein as regards the relative function.

In the presence of considerable leakage dependence is placed upon the time of appearance of the phthalein, urea per cent, and diastase.

In the presence of inhibition the urea per cent and diastase are the factors of greatest value taken in conjunction with the clinical findings.

The phthalein and Marshall's urea determinations are made with great ease and take but little time. The diastase, while exceedingly simple, is time consuming. Freshly prepared soluble starch solution is needed anew each day, and at least a half-hour actual time is necessary for each test.

Diastase is of value in the majority of cases in indicating which is the diseased or more diseased kidney.

In the majority of instances it is not necessary and adds nothing to the information obtainable from the phthalein or urea determinations, which are more easily made.

In cases with leakage or serious catheter inhibition, but in which sufficient urine to allow a diastase determination has been obtained, the test is of value.

Dilution affects the urinary diastase content to a less extent than it does urea per cent.

Dilution is not a negligible factor in regard to this test, total diastase content being at times of greater importance.

Neutralization of the urine is not a negligible factor in the technique of the test.

ERRORS OF DIAGNOSIS IN EAR DISEASES.

YEARSLEY (*Clinical Journal*, Dec. 17, 1913) believes that most errors of diagnosis are traceable to incorrect observation. Much attention should be paid to the general condition of health and a thorough physical examination. It is noted that tenderness in front of the tragus usually means inflammation of the external meatus; under the ear, Eustachian tube involvement.

Attention is called to the fact that even a marked loss of bone conduction does not mean nerve deafness, unless it is accompanied by a diminution of hearing for high tones. Reduction in the high tone means internal ear involvement; reduction of the low tone indicates middle-ear deafness. The amount of this reduction in hearing for low tones is a valuable guide to prognosis, the outlook as regards treatment being worse in proportion to the amount of this reduction. When the patient cannot hear a C128

tuning-fork by air-conduction, the chances of marked amelioration begin to be slender. Theoretically every case should be examined for nystagmus, and by the caloric and Romberg's tests. Reflex otalgia, cough, hiccough, syncopal attacks, taste reflexes are referred to it. Cerumen at times gives rise to confusion in diagnosis, unskilled syringing having only served to drive the plug more deeply in the meatus and so accentuated the deafness, and even given rise to pain. The ceruminous accumulations may appear as hard, black, glossy plugs, or as white, softish masses, with every gradation between these two extremes. When mixed with much dead epithelium they require careful loosening by means of peroxide of hydrogen before removal. Very fluid wax may be mistaken for discharge, especially when it becomes foul, as it may do in schoolchildren of the lower classes.

Granulations in the ear may be classified roughly into three divisions: those due to neglect, those due to caries, and those due to malignant disease. The first are usually large, filling the meatus and sometimes protruding from its aperture. Once removed and proper after-treatment instituted, the case will clear up rapidly. Granulations due to caries are usually smaller, recur on removal, and grow from ossicles on the inner tympanic wall, discharge being usually fetid. Granulations due to malignant disease recur rapidly, are exuberant and very friable, and bleed readily. A perforation in the posterior part of Shrapnell's membrane, if it has existed any length of time, is due to caries of the body of the incus, possibly with mastoid involvement; to caries of the head of the malleus and of the attic wall when it is in the center; and to attic disease associated with infection through the Eustachian tube when situated anteriorly. Perforations of the anterior segment of the membrana tensa, especially when low down, are usually associated with Eustachian involvement. The posterior superior perforation of the membrana tensa usually means caries of the long process of the incus, and is often associated with mastoid trouble.

Mastoid disease is likely when after careful cleansing and drying pus reappears in the upper and posterior part of the tympanum, or can be sucked out by the Siegle pneumatic speculum.

Cholesteatoma is indicated by the appearance in a discharge of some standing of white, pearly-looking skins coming from the attic. The suspicion is confirmed if the patient suffers from periodic headache and attacks of pain from hygroscopic swelling of the accumulations of these skins.

In chronic suppuration the tympanum must be attacked from the side of the nasopharynx as well as from the external auditory meatus or the results are disappointing. Regular inflation must be practiced, and applications must be made to the tympanic opening of the tubes. If the chronic middle-ear discharge in children does not disappear after the removal of adenoids in children it indicates an imperfect removal of the adenoids or want of sufficient after-treatment of the nose and nasopharynx. Usually portions of the hypertrophy have been left in the Rosenmüller fossæ.

There are, however, cases of slow, chronic progressive deafness in which, without any special history of recurrent colds in the head, the tympanic cavity becomes invaded gradually, via the Eustachian tube, by extension from the pharynx, and these are sometimes distinguished by the name of "chronic dry catarrh." Such cases are sometimes difficult to distinguish from the condition known as otosclerosis.

In all cases of commencing middle-ear catarrh (and it must be remembered that the Eustachian tube is only part of the middle-ear tract, and that, as an American otologist has put it, the real orifice of the Eustachian tube is at the external naris), if there is any abnormality in the nose and nasopharynx, every effort must be made thoroughly to remove it, if the patient is to be saved from progressive deafness. It is not enough, in cases of deflected septum and posterior end hypertrophy, to try to palliate matters by nasal sprays and washes; the cause has to be remedied by operation. The former is mere dilettante temporizing;

the latter is efficient treatment—a very great difference. If prompt and efficient measures are taken at the outset the progress of the catarrh can be arrested.

In the next stage, that of the organization of inflammatory products, Eustachian obstruction is more marked, and the process will very likely have reached the tympanum, as shown by changes in the membrane beyond those of mere indrawing. There may be more or less impairment of the mobility of the malleus, and the tuning-fork reactions will show a greater departure from the normal. Rinne will be more decidedly negative, and this may be so for forks higher in the scale, such as C512. Bone-conduction will be increased, and the low-tone limit still further involved. Even now the removal of the cause and the restoration of the nasal air-way will bring about great improvement in the hearing, although it may be necessary to treat the ears in addition after operation.

In the third and fourth stages prognosis becomes more doubtful or decidedly less hopeful. It is in these stages that the symptom of paracusis willisii, or hearing better in a noise, usually makes its appearance, a condition generally considered as a sign of great import as regards prognosis.

The chief points to be noted in the diagnosis of the last two stages of catarrhal middle-ear deafness are fixation of the malleus and the stapes. The presence or absence of these points makes a great difference in prognosis. In such cases the loss for low tones is greater, Rinne's test is doubly negative—that is to say, for high and low forks—and Gelle's test, when the stapes is fixed, is negative.

In some cases one meets with a chronic, slowly progressing middle-ear catarrh in which a chronic dry pharyngitis and nasopharyngitis, without much or any history of frequent colds, has slowly extended to the tympanum through the Eustachian tube without causing any appreciable narrowing of the latter canal. They present all the changes met with in the later stages of ordinary middle-ear catarrh, and are sometimes called by the name "chronic dry catarrh." They are more difficult to manage in treatment, prognosis is not good, and they must be reckoned with in making a diagnosis.

In regard to the diagnosis between the late stages of catarrhal middle-ear disease and the condition known as otosclerosis, some observers have confounded the two, and error is likely to occur. The term "otosclerosis" should be confined rigidly to those cases to which the name—a bad one, but one that must be retained now for convenience—was originally given. Cases of late middle-ear catarrh, to which the term "otosclerosis" has been applied, should be considered rather under the title of post-catarrhal deafness. They show a marked degree of loss of hearing, and give the tuning-fork reactions for middle-ear deafness. The changes in the membrane and Eustachian tubes are such as have been described, and the cause will be demonstrable in the nose and nasopharynx. True otosclerosis should be taken to mean a group of cases in which the nose and nasopharynx are normal or present no special abnormality, the Eustachian tubes are patent, the tympanic membranes are normal in texture and inclination. A marked salmon-pink reflex is usually to be noted shining through the membrane in the region of the promontory or of the stapes, but may be absent, and the tests show fixation of the stapes, with a negative Rinne, a negative Gelle, increased bone-conduction, and marked reduction of hearing for low tones. Paracusis willisii is a constant and early symptom. These cases are not middle-ear cases at all; they are due to a condition affecting the bony labyrinthine capsule, in which new bone is thrown out, ankylosing the foot-plate of the stapes in the fenestra ovalis, and osteoporosis occurs in the bony labyrinthine walls. With these changes is also frequently found degeneration of the specialized epithelium of the cochlea, so that, in some cases, there is loss of bone-conduction and reduction in the limit of hearing for high tones. These cases occur much more frequently in women than in men, begin usually between the ages of twenty and thirty, often start with pregnancy, and in a considerable percentage show a distinct heredity. They may be ac-

companied by ordinary catarrhal deafness, which makes the diagnosis more complicated.

Senile deafness may appear earlier than is usual in middle-ear cases of some duration. It is important, when it occurs, to recognize this fact, and to avoid too active treatment. It is, unfortunately, a lesson which is only to be learned by experience, that in old people in whom senile deafness complicates old middle-ear catarrh the former increases more rapidly than when it is the only condition present, and that, if too active treatment by inflation, etc., be tried in the hope of benefiting the middle-ear condition, the senile deafness is markedly increased.

An uncomplicated rupture of the membrane will usually heal readily and with good hearing, but if there be any concomitant concussion of the labyrinth, as shown by loss of bone-conduction and reduction in the limit for high tones, the prognosis is much less favorable. Hence it is highly important to test every case with care if one is to avoid serious error in diagnosis and prognosis, for, be it remembered, some of these injuries may become the subjects of litigation.

Quite a moderate amount of violence may cause labyrinthine concussion, even without a ruptured membrane. It takes a considerable force to rupture a healthy membrane, and in the majority of cases there is some preëxisting disease when it occurs. Hence, occasionally, the force of a blow may be expended upon the labyrinth after passing through the more yielding membrane and ossicles.

Another point upon which advice is sometimes sought is as to prognosis after injury to the labyrinth either by concussion or by a fracture of the base of the skull passing through the petrous portion of the temporal bone. Prognosis should always be very guarded in such cases, and it may be taken as a rough general guide that, if there be no improvement when six months has elapsed from the time of the injury, any recovery of hearing is hopeless.

Whenever a patient complains of vertigo he should be carefully examined by means of the labyrinthine tests. When chronic suppuration exists, examination should be exhaustive in order that a correct diagnosis as to the presence or absence of definite labyrinthine disease may be made. Sometimes vertigo is complained of in the course of a chronic suppuration which is due simply to the irritation of the labyrinth caused by the long-continued congestion of the middle ear or by pressure of retained discharge, cholesteatomata, polypi, and the like, without the labyrinth itself being involved. These cases clear up readily under appropriate treatment, and it is highly important to differentiate them from the point of view both of prognosis and management. As a matter of fact every case of chronic suppuration of the middle ear that has lasted for some time should be examined to discover the exact condition of the labyrinth.

When vertigo occurs without suppuration, tests and history should receive careful attention. The symptom may, in some cases, depend upon a toxemia.

In children a very large amount of severe deafness leading to deaf-mutism is caused by meningitis. It is unfortunate that at present only the epidemic cerebrospinal and tuberculous form are notifiable, for, although notification of these diseases was based originally upon their infectivity, it is more than probable that numerous other forms of meningitis are due to infection. The only possible way in which we can cope with child-deafness from meningitis is by prevention.

A rare form of internal ear deafness, when we consider the frequent occurrence of the disease from which it may result, is that due to mumps. It is a form every practitioner should be well alive to, for it is only by its prompt recognition and immediate treatment that the hearing can be saved, and whenever a case occurs it is the imperative duty of those in charge to see that immediate measures are taken.

In all cases of internal ear deafness in which there is any doubt as to the exact nature of the cause, search should be made for syphilis and the Wassermann reaction taken.

REVIEWS.

MEDICAL GYNECOLOGY. By Samuel Wyllis Bandler, M.D. Third Edition, Thoroughly Revised. Original Illustrations. The W. B. Saunders Co., Philadelphia, 1914. Price $5.00.

As the GAZETTE has spoken favorably of the earlier editions of this work there is little more to do than to recognize the appearance of the third edition, which comes before us six years after the publication of the first. The book is most copiously and usefully illustrated, almost every procedure which is discussed being shown pictorially. It is a medical gynecology, not in the sense that it attempts to treat conditions by drugs in distinction from the use of the knife, but because it gives information as to the employment of measures which lie between these two types of treatment, such as the use of dilators, the introduction of sounds and pessaries, and the employment of glands of internal secretion derived from animals. In these days of enthusiastic operative procedures upon the genital organs of women it is rather refreshing to know that so much can be done by measures which do not include operation. It must not be thought, however, that medicinal measures are ignored. On the contrary, they are not only given in detail, but formulæ are printed to illustrate how they should be given. If the book is anything like as successful as it deserves to be it will not be long before the present edition must go to press a second time, or a new edition must be prepared.

RADIUM THERAPEUTICS. By N. S. Finzi, M.D., M.R.C.S., L.R.C.P. The Oxford University Press, London and New York, 1913. Price $2.00.

In this little book the author has tried to place before us a brief and clear account of the action and use of radium and its rays, bearing in mind the limited state of our knowledge concerning the therapeutics of this substance. It would be hard to think of a theme which is more interesting to the profession and laity at the present time than this, particularly in view of the enthusiastic and probably unwise announcements which have been made concerning radium in the treatment of cancer within the last few months. We therefore naturally turn to that part of the book which deals with the use of radium in carcinoma. We find Finzi advises that the following rules must be adhered to, namely, that the whole tumor and the site of any local metastases must be exposed to the rays, which must be adequately filtered, that as much radium as possible must be used, and that maximum doses should be given; the application being repeated about every six weeks until all trace of the tumor has disappeared. After this, prophylactic doses are to be given at an interval of two months and the patient kept under observation for some years. We are glad to note that the author is sufficiently wise to recognize that a large proportion of the cases of carcinoma cannot be materially benefited by this agent because of their nature and situation. He thinks that in inoperable cases radium will in ten or fifteen per cent cause a disappearance of local growth, and states that some patients have remained free from recurrences for several years, but he points out that only too frequently metastases eventually destroy life. Finally, he wisely points out that it will be many years before it will be possible to determine the permanency of the results.

THE EARLY DIAGNOSIS OF TUBERCLE. By Clive Riviere, M.D., F.R.C.P. The Oxford University Press, London and New York, 1914. Price $2.00.

The author points out in his preface that the public demand for the suppression of tuberculosis has emphasized the need on the part of the profession of medicine of reaching an early diagnosis. Surely, this need was appreciated by the profession long before the laity took much interest in it, and for the very much more proper reason that the early recognition of tuberculosis means that a fairly large proportion of cases are cured. We are glad to note that the author not only emphasizes the impor-

tance of pulmonary tuberculosis, but also tuberculosis of the thoracic glands, and especially hilus tuberculosis in children, a condition which we believe to be very much more frequent than is generally supposed. Many cases of prolonged unexplained fever and loss of weight are dependent upon intrathoracic lesions without involvement of the pulmonary tissues themselves. The book is carefully illustrated, and the methods of diagnosis by physical signs and the various forms of tests with tuberculin are adequately considered. There is also a chapter upon the temperature and the sputum as diagnostic aids, as well as a consideration of the employment of the *x*-rays. The book closes with a useful and fairly complete bibliography, complete in the sense that it gives a clue to good literature without of course attempting to cover the whole field, which if covered would make a volume as thick as an ordinary dictionary.

THE PRACTICE OF PEDIATRICS. By Charles Gilmore Kerley, M.D. Freely Illustrated. The W. B. Saunders Co., Philadelphia, 1914. Price $6.00.

Dr. Kerley has prepared one of the larger and more exhaustive works upon this important subject covering 878 pages. In some respects it may be considered as a book on the Practice of Medicine with Special Reference to Children. Its opening pages deal with nutrition and growth, including methods of feeding. Following this text there is a chapter upon the examination and diagnosis of children's diseases, and after that various diseases of different portions of the body are discussed. Clear and definite directions are given by the author as to the plans of treatment which he advises, and the illustrations are good and typical in most instances. A chapter which will interest physicians who have to deal with schoolchildren is that which deals with posture and breathing, and which gives illustrations showing the exercises a child should take. To those who have no other exhaustive books upon diseases of childhood this chapter will probably be not only novel but particularly useful. We note with interest that the author is one of those who evidently still considers that alcohol is a stimulant, because he not only speaks of it as such, but also recommends its employment as a means of combating loss of vitality in the presence of severe infections.

DIAGNOSTIC SYMPTOMS IN NERVOUS DISEASES. By Edward Livingston Hunt, M.D. Illustrated. The W. B. Saunders Co., Philadelphia, 1914. Price $1.50.

By way of explaining his reason for presenting this text the author states that for several years his students at Columbia University have asked him to name a book in which they could find salient points and leading symptoms of the principal nervous diseases without the laborious search involved in consulting the larger text-books. This statement in his preface not only explains his thought but also gives an adequate conception of the character of the text. The book is a small one of 216 pages, and we think that those who purchase it will find that the author has met the needs of his students and of the general practitioner in a very competent and excellent manner. If there is any criticism it is that the volume is too condensed.

As the diagnosis of nervous diseases is in many cases difficult, particularly for those who are not engaged solely in this special branch of medicine, we believe that the present volume fills a need and that its text will be greatly appreciated.

DIGESTION, CONSTIPATION AND LIVER DISORDER. By G. Sherman Bigg, F.R.C.S., Edinburgh. Paul B. Hoeber, New York, 1913. Price $1.50.

The rather unusual title of this small book has its explanation in the fact that the author is now a resident of Allahabad, India, a country in which disorders of the digestive system, and particularly of the liver, are frequently met with. As the text covers only 163 pages it is manifest that the author has not attempted to prepare an exhaustive treatise. It is evidently compiled as a guide to fellow practitioners in the East and with the intention of presenting the methods which he himself employs. He has no hesitancy in frankly expressing his preference for pharmaceutical preparations bearing special names or prepared by special

manufacturers. To many this character of his book will prove attractive, since on reading its pages the reader will feel that he can carry out the measures which the author himself would undertake. Prescriptions are given which illustrate useful combinations.

A HANDBOOK OF MEDICAL TREATMENT. By James Burnet, M.A., M.D., M.R.C.P. The Macmillan Co., New York, 1914. Price $1.25.

Two editions of this little book have already appeared on the other side of the water. It is not as large a volume as might be supposed from its title. On the contrary, it is small enough to be slipped into the pocket of a sack coat. It covers 168 pages of rather closely-printed text and discusses the various diseases in alphabetical order. In many instances the directions which are given are exceedingly brief, even if accurate. As a handy little book which can speedily be turned to for an idea in an emergency, it can be recommended, but is far too brief and incomplete to be used as a text-book or ordinary work of reference.

INDEX CATALOGUE OF THE SURGEON-GENERAL'S LIBRARY. Second Series, Volume XVIII. Library of the Surgeon-General of the United States Army. Tetamore to Tzschirner.

All of those members of the medical profession who have much to do with medical literature are thoroughly familiar with the Index Catalogue of the Surgeon-General's Library, which has become absolutely indispensable to scientific medical men not only in this country but everywhere in the civilized world. It is a monument to the literary industry of the officers in that Library. As will be seen from the letters on the present volume, the second series is rapidly approaching completion.

GUNSHOT INJURIES. By Colonel Louis A. Lagarde. William Wood & Company, New York, 1914.

It is pointed out in the author's preface that the subject of gunshot injuries as a whole has been so modified by the radical changes in the armament of the nations, and the results in wounds by firearms have been so bettered by modern methods of treatment, that the works of Otis and his contemporaries have now been entirely superseded as far as practical surgery is concerned.

In this work the author has as far as possible presented the characteristic features of wounds by the old armament in preantiseptic times, and compared these with the results of gunshot injuries by modern arms in the Spanish-American, Anglo-Boer, Russo-Japanese, and Turko-Balkan wars. He has also availed himself of the character of wounds by firearms in civil life and their results as compared to similar wounds in the military service. Like observations have also been made to a less extent on wounds by different kinds of rifles, pistols, and revolvers on animals, experimentally and in the hunt.

The main portion of the book is culled from lectures which form the basis for teaching in civil and military medical schools. A chapter is devoted to Technical Considerations, gunshot wound implying from the military standpoint wounds from the effects of any explosive force. It is pointed out that breechloaders were known since the reign of Henry VIII. This chapter, revised as it has been by the Chief of Ordnance, is one of very great interest, it being stated that recent successes in the Pan-American Olympic demonstrate that we have the most accurate rifle in the world. It is predicted that the automatic rifle will be the military weapon of the future.

There is a chapter upon Characteristic Lesions Caused by Projectiles, including those from Artillery and those incident to Grenades, Bombs, and Mines. It is interesting to note that in the treatment of shock strychnine is regarded as one of the most useful medications. Hand grenades produce injuries which invariably suppurate when the wound is of any magnitude, as do injuries caused by shrapnel balls. This same tendency is not exhibited by modern rifle-bullet injuries, although it is noted that if one takes pains to examine, the wound of exit especially, he will generally find pus. In the Santiago campaign infection of the wound of exit from the Spanish Mauser bullet was the rule. When a bone

is extensively comminuted and the skin wound lacerated suppuration occurs in spite of the first dressing. It is to be observed that the mortality among those who reached hospitals was 14.3 per cent during the Northern Civil War. From the same class of cases the mortality was 6 per cent in the Spanish-American War, 8 per cent in the Boer War, and in the Russo-Japanese War it was 5.8 per cent on the Japanese side and 3.4 per cent on the Russian side. The reason for this lessened mortality is only partially incident to the general application of the first-aid dressing.

In tetanus from toy pistols it is shown that while neither the wadding nor the powder contains the germ, it may do so and transmit it at the time of explosion. There is a chapter upon the treatment of Gunshot Wounds in General. Thereafter the matter is taken up regionally, presenting a statistical and the essentially clinical study. There is, finally, a chapter upon Medico-legal Phases of Gunshot Wounds and Field *X*-ray Apparatus.

This book, of fascinating interest to any educated person, is one which brings to the practitioner that knowledge the possession of which may at any time be life-saving. The work constitutes an adequate text to an important branch of surgery.

THE PRACTICAL MEDICINE SERIES. Under the General Editorial Charge of Charles L. Mix, A.M., M.D. Volume IX: Skin and Venereal Diseases, Miscellaneous Topics. Edited by W. L. Baum, M.D., and Harold N. Moyer, M.D. Series 1913. The Year Book Publishers, Chicago, 1913.

To one who wishes to keep in touch with the fashion of the day as applied to medicine and surgery and the special departments of each, a number of this series comes as a welcome guest.

This volume opens with a somewhat spectacular article having for its topic "The Skin as an Index of Disease." The author is quoted to the effect that the brownish splotches of chloasma hint at diseased uterus or ovary. Rose-colored spots on the abdomen of a fever patient may clear up an obscure case even before a Widal test is available. Erythema, roseola, or petechiæ may settle a dubious diagnosis of cerebro-spinal meningitis. The muddy look accompanying intestinal torpor is everywhere in evidence. While herpes labialis is regarded as a sign of malarial infection, chronic congestion of the face, neck, and ears in connection with mental dulness arouses suspicion of chloral addiction. Xylol is commended for pediculosis, since it penetrates and dissolves the chitinous covering of the nits, causing the rapid death of the insect. It is made up of two parts of xylol, one part of alcohol, and one part of ether, and it is asserted that a single application of this solution dabbed on the affected parts is usually sufficient for a cure. An ointment of one part xylol and two of vaselin is also effective for rubbing in after washing with soap and water. It should be remembered that this mixture is extremely inflammable.

The most useful general application for all kinds of leg ulcer is said to be iodide of starch paste. The formula given by Williams is: starch, 10.5 gm.; glycerin, 20 gm.; water, 60 gm.; boil, and when nearly cold add liquor iodine (B. P.) 5 gm. This paste is applied very thickly to the ulcer so as to overlap well the edges. Thereafter a bandage is applied and the dressing is repeated in accordance with the discharge.

Fischer reports a number of cases of eczema treated successfully by the *x*-ray.

Lilienthal holds that 50 per cent of gonorrheas can be aborted by the injection of 40- to 50-per-cent protargol, providing the cases are seen early.

Henderson in treating females swabs the external genitalia and also the inner lips of the labia minora and of the labia majora with alcohol. The Skene ducts are also found and treated with a fine nozzle, as are the vulvovaginal glands. The cure is usually prompt and complete.

Noguchi's paper on Brain Paralysis is justly set forth. The cutaneous reaction of syphilis is described at length, also end-to-end suture of blood-vessels for the purpose of accomplishing transfusion.

Spermatocystitis receives rather large space for a book of this size.

There is a miscellaneous chapter bearing on the Medicine of Homer, Seventeenth Century Graft; Medical Economics, Sociology and Eugenics. The book should be read by all practitioners.

A Manual of Otology. By Gorham Bacon, A.M., M.D. Illustrated. Lea & Febiger, New York and Philadelphia, 1913.

The call for a sixth edition of Bacon's manual sufficiently attests the favor with which this truly admirable text-book has been received.

There is a brief but excellent chapter upon anatomy and physiology, followed by one upon the methods of examination. In the latter the really serviceable modern instruments are mentioned and, where needful, described, including Valsalva's noise apparatus, Blake's tuning-fork, and Galton's whistle. Rinne's, Weber's, Bing's, Schwabach's, and Gelle's tests are described with satisfactory brevity and clearness. Diseases of the auricle, the external auditory canal, the drumhead and middle ear, the nasal passages and their relation to hearing are considered systematically. There are final chapters upon diseases of the mastoid process, intracranial complications, disease of the sound-receiving apparatuses, and deaf-mutism.

This book well serves the purposes of either the student or the practitioner.

Cancer: Its Cause and Treatment Without Operation. By Robert Bell, M.D., F.R.C.P.S. Second Edition, Revised. G. Bell & Sons, Ltd., London, 1913.

Bell, whose position in charge of the Cancer Research Battersea Hospital should entitle his views to at least an attentive hearing, looks upon a cancer as a preventable disease and one entirely incident to civilization, having its origin in some flagrant contravention of hygienic laws. His hypothesis is to the effect that life is due to a succession of fermentative changes, and that these changes are under the control of certain functional processes continually going on, from which he infers that the thyroid gland possesses a powerful influence upon the metabolism of the epithelial cells and that the development of cancer may be due to inefficiency of this gland. His first paper upon this subject was read in 1896, and if the germ then planted was a really vital one, it is evident that it required for its development special soil, since there are few who have accepted even the fundamental concepts of the author.

A Treatise on the Diseases of Women. By Palmer Findley, B.S., M.D. Illustrated. Lea & Febiger, Philadelphia and New York, 1913.

This book, which the author states is a natural outgrowth of his work on diagnosis of diseases of women, is designed to present the subject in detail without cumbering the text with needless repetitions. Therefore such subjects as Non-Operative Methods of Treatment, Hygiene and Dress, Preparation of the Patient for Operation, Preparation of Operating Room, Field of Operation and Surgical Utensils, Choice of Anesthetic, Diet, Postoperative Complications and Care of Patients after Operations have been treated in separate chapters. Indeed attention is concentrated upon conservative methods, Findley believing that these have not received their due share in text-books and in practice. Gonorrhea and Tuberculosis in Women are considered with more than the usual detail.

The classification and general arrangement of the book are excellent. After some pages devoted to clinical history in the form of case records, the general subject of Hemorrhages from the Genital Tract is taken up. Thereafter logically follows a chapter devoted to Disorders Associated with Menstruation, including Backache and Diastasis Recti. There is a brief, thoroughly practical chapter on bacteriological examinations, whilst the directions for physical examinations are given in most satisfactory detail. The final chapter is devoted to postoperative treatment and complications following operations.

This book is particularly strong on diagnosis. The subjects considered are presented in a systematic, orderly, logical form easy of access and very adequately covered in accordance with modern thought and

practice. It is perhaps because of the multiplicity of text-books on Gynecology and the competition thereby engendered that comparatively so many of them have reached such a high standard of excellence.

THE PRINCIPLES AND PRACTICE OF GYNECOLOGY. By E. C. Dudley, A.M., M.D. Sixth Edition, Revised. Illustrated. Lea & Febiger, New York and Philadelphia, 1913.

This last edition of Dudley's deservedly successful text-book has been revised and rewritten with a thoroughness as commendable as it is unusual. It therefore presents in a well systematized and most acceptable form those diagnostic features and points of operative technique which are recognized as standard in the world's best clinics.

The book is divided into six parts: the first part is devoted to General Principles; the second part to Infections, Inflammations, and Allied Disorders; the third part to Tumors, Tubal Pregnancy, and Malformations; the fourth part to Traumatism; the fifth part to Displacement of the Uterus and other Pelvic Organs; the sixth to Disorders of Menstruation and Sterility and Incontinence of Urine.

To the publishers should be accorded a high degree of praise for having produced a book thoroughly satisfactory in material and workmanship, thus providing a fitting frame for the text, noteworthy because of its power of brief but lucid description. This ranks easily among the best of the many excellent text-books written for the purpose of elucidating and standardizing the practice of gynecology; nor does the picture of a perfectly good hairpin occupying a position of graceful repose in a theoretical bladder, as shown on page 338, countervail in the least the favorable impression produced by reading any page of this work.

CORRESPONDENCE.

LONDON LETTER.

BY J. CHARLTON BRISCOE, M.D.

The Chancellor of the Exchequer made a very interesting speech a short while ago at a dinner organized to acknowledge the services of Dr. Addison, a medical member of Parliament, who played a very conspicuous part in the controversy over the National Insurance Act. Mr. Lloyd George reviewed the whole question of the pay of panel doctors in the light of the results apparent at the end of the first year's working of the Act. He reminded his hearers that before the Act was put into operation, an examination was made of the accounts of the doctors in five towns. Comparing these accounts with the distribution made under the panel system, he reckoned that the average increase in receipts in these cases was anything from £150 to £200 per annum. He acknowledged at the same time that more work had been required, but he did not think that most doctors would grumble at extra work if they got extra pay. He added that the difficulty experienced in obtaining a "locum tenens," or an assistant, at a reasonable figure showed that the Insurance Act had not produced that wholesale ruin in the profession so freely prophesied at its introduction, although many grumbles are still heard at the working of the panel system. On the whole, the Chancellor's description is accurate, and men with poor practices find that their incomes are increased, while considerably more work is required of them. In reply to the toast of his health, Dr. Addison said he believed that the changes initiated by the Chancellor would result in improvements both in the public health and the practice of medicine. Public attention was being more concentrated on the need of preventive measures and the more efficient early treatment of sickness, and the better organization of the

public health services required the coördination of those services, especially in London, where there is at present a great deal of overlapping.

The President of the Board of Agriculture is evidently determined to push forward the attack on the animal diseases which cause so much loss annually in this country. Considering that the greater part of the agricultural revenue is derived from stock-raising and allied pursuits, it is obvious that the elimination of disease is a matter of national concern. Hitherto the veterinary profession has carried on its research work hampered by the lack of funds, but Treasury grants will enable that work to be carried on in a much more efficient manner, and the outlay will soon be repaid if the amount spent in compensation for slaughtered animals can be diminished. It is encouraging to know that Sir Stewart Stockman, who has been investigating the question of epizoötic abortion, has obtained hopeful results, although he has not yet made any pronouncement on the subject; but organized trials made by some of the farmers' societies under his guidance have given rise to the belief that ultimate success in dealing with this disease is certain.

The authorities of the London Hospital have just received the offer of a sum of £10,000 to provide accommodation for the treatment of syphilis. This gift will enable the hospital to establish a special department for the treatment of this disease, and to provide about twelve or fifteen beds with laboratory accommodation. The House Committee had recently decided that intravenous injections of salvarsan ought not be given in the out-patient department, but that the patient should be in bed under proper nursing supervision, so that this gift will enable them to carry their resolutions into practice. The new department will be intended chiefly for the treatment of primary and secondary syphilis, but the effect of salvarsan on certain tertiary nervous manifestations will be investigated, as undoubted improvement has been noted in some cases.

The London County Council are considering an important development with regard to the future of St. Katharine's Hospital, a very ancient foundation, originally settled in the East End of London. The hospital was founded and endowed in A. D. 1148 by Queen Matilda, wife of King Stephen, for the repose of the souls of two of her children. The original site was on the east side of the Tower of London. In 1273 the hospital was refounded by Queen Eleanor, who granted a new charter, by which the patronage was reserved forever to the Queens of England, with absolute power in the regulation of administration. Here the hospital remained for some centuries with the addition of a school for poor children, established in 1705. In 1825, St. Katherine's Dock Company obtained power to buy the site by Act of Parliament, and the hospital was compensated by the gift of land in Regent's Park, on which new buildings and a church were erected. At the same time the income of the foundation was considerably increased by the investment of part of the purchase money, but all connection with the East of London was lost. In 1871 a Royal Commission inquired into the advisability of devoting part of the income for the benefit of the East of London, and the House of Lords presented an address to Queen Victoria, urging that due attention should be paid to the spiritual and educational necessities of the parishes adjacent to the old precincts of the hospital. Nothing, however, was done until the County Council considered the matter again in 1893, and suggested that nursing homes should be established with centers in all parts of London, but the Lord Chancellor declared that the Council could not move until the Queen had declared her pleasure. It is now announced that the Lord Chancellor has prepared a new set of rules for the hospital, under an authority given by Queen Alexandra, and that the primary object of the new rules will be to restore to the poor of East London the benefits of the ancient foundation. It is probable that a college will be established, to provide a body of qualified resident women health-workers and to enable women students to obtain adequate training in such work. Such a scheme will,

in all probability, meet with universal approval.

The recent wide-spread epidemic of measles has induced the Metropolitan Asylums Board to undertake a special investigation into the origin of that disease and the best methods of preventing it. A research pathologist has been appointed to inquire into the causation, infectivity, prevention, and treatment of zymotic diseases, and his special attention is at present being directed to an investigation of the origin of measles. This winter the usual epidemic of measles has been of an unusually severe type, with many unpleasant sequelæ.

The annual report of the Chief Medical Officer of the Board of Education gives a full account of the measures taken to supervise the health of schoolchildren in this country. Over 1000 medical men and women are engaged in school inspection in England and Wales, and about 700 nurses are also employed. The prevention of uncleanliness still occupies a great deal of time, unfortunately, but the returns show a progressive improvement during the six years of medical inspection. Roughly speaking, about six million children are registered on the books of the Public Elementary Schools in England and Wales, and of these about 10 per cent suffer from serious defect of vision, about 10 per cent have adenoids, inflamed tonsils or enlarged cervical glands, and more than half are in need of dental treatment. The Chief Medical Officer considers that more attention is now being paid to the fuller differentiation of abnormal children, and he remarks that there is a tendency on the part of the authorities to provide a modified curriculum for such children. There has been a great increase of efficiency in the routine work of inspection, and the efforts to follow up and reinspect cases after treatment have become more systematized. It is encouraging to hear that the lay authorities are beginning to realize that school medical officers can give much assistance as to the hygiene, lighting arrangements, and general equipment of a school. If this coöperation progresses and attention be paid to the future industrial employment of a child on leaving school, a very definite advance will have been made in the educational system of this country. The Board of Education are at the present time considering a scheme for providing more medical treatment for schoolchildren. The new scheme will involve a considerable increase in the medical staff, but the Board propose to make grants to cover 50 per cent of the expenditure incurred, if they are satisfied of the adequacy and efficiency of the treatment given. The Chief Medical Officer remarks that the provision of meals for necessitous children is still on a very unsatisfactory basis, and he considers that the present methods are not likely to produce much improvement in the general physique of underfed children. There is, however, a considerable section of educationists who regard the feeding of the schoolchildren as a step in the wrong direction, as they feel that it must lead to a lessening of parental responsibility, and thus do more ultimate harm than present good.

We regret to have to record the death of Dr. Julia Cock, which occurred after a long and painful illness. Miss Cock formed one of the group of pioneers who opened the medical profession to women in England, and for many years was visiting physician on the staff of the New Hospital for Women. She devoted herself especially to the perfecting of the equipment of the pathological department of the hospital. For the last eleven years she held the position of Dean of the London (Royal Free Hospital) School of Medicine for Women, and she will be chiefly remembered for the administrative gifts and organizing ability she brought to that task. Her death at a comparatively early age is a severe loss to the ranks of consultant women in the metropolis.